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THE HOME AND SCHOOL REFERENCE WORK

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VOLUME IV

THE HOME AND SCHOOL EDUCATION SOCIETY

NEW YORK CHICAGO LOS ANGELES

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In" dianap' olis, Ind., capital of the state of Indiana and county seat of Marion Co., 183 m. s.e. of Chicago, 824 m. w. of New York and 109 m. n.w. of Cincinnati, on the West Fork of the White River and on the Cincinnati, Hamilton & Dayton, the Lake Erie & Western, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Chicago, Indianapolis & Louisville, the Lake Erie & Western, the Cleveland, Cincinnati, Chicago & St. Louis, and Vandalia and other railroads. There is an extensive electric street-car system, with more than 200 m. of track. The city contains a large traction terminal station, and it is one of the most prominent centers of interurban traffic in the country. The site of Indianapolis is generally level and is surrounded by wooded hills. The city is situated at almost the geographical center of the state and its location and extensive railroad connections make it one of the principal industrial centers of the United States.

Parks and Boulevards. Indianapolis covers an area of about 50 sq. m. Four principal avenues—Massachusetts, Indiana, Kentucky, and Virginia—radiate from the circular Monument Place, which contains the Soldiers' and Sailors' Monument erected by the state, which rises to a height of 284.5 ft. Pennsylvania, Meridian and Delaware are among the finest residence streets. Morton Place and Meridian Heights are also handsome residence districts. Washington Street has a width of 120 ft. and is a section of a road projected to run from Baltimore to St. Louis. There is a fine system of public parks, which add to the attractiveness of the city and include the St. Clair, Military, Brookside, Fair View, Garfield, Riverside, and University, with a total area of 1311 acres. Woodruff Place is a beautiful residence park, with fountains, esplanades and statues. The city contains statues of George Rogers Clark, William Henry Harrison, Schuyler Colfax, Oliver P. Morton, Benjamin Harrison, Maj. Gen. Henry W. Lawton, and Thomas A. Hendricks.

Public Buildings. The most noteworthy building is the state capitol, which has a central tower and dome 240 ft. high. The capitol building covers two acres of ground and stands in a square of eight acres. Among the other prominent buildings are the Federal Building, containing the post office, custom house and Federal court rooms; the county courthouse, costing $1,750,000; city hall; Tomlinson Hall, a bequest of Dr. J. M. Tomlinson; the Propylaeum, a clubhouse for women; Union Railway Station; the Commercial; the Athenæum and Academy of Music clubhouses; the Y. M. C. A., the Y. W. C. A., and Murat Temple, the home of the Shriners. The city is well supplied with libraries; the Riley Memorial Library with over 100,000 volumes and ten additional libraries, including the state and the state law libraries. The public buildings and business blocks are substantial and built chiefly of Indiana building stone. Ft. Benjamin Harrison, named in honor of President Harrison, whose home was in Indianapolis, is an important United States army post located near the city. Indianapolis is the seat of a Catholic see and of an Episcopal bishopric. There are about 185 churches, including a number of missions. Among the fine hotels of the city mention may be made of the Claypool, the Severin, the English, the Dennison, and Washington, the Lincoln and the Edward.

Institutions. Indianapolis is an important educational center. Among the leading institutions are: the University of Indianapolis formed in 1896, which united Butler University, the Indiana Dental College, and the Indiana Law School; the Indiana Medical College (The School of Medicine of the University of Indiana); the Indianapolis College of Law; the State College of Physicians and Surgeons; the Indiana Veterinary College; the Indiana Primary Normal Training School. The city school system is extensive, there being 73 school buildings and several high schools. Of advanced educational schools mention should be made of the Indianapolis Nor-

mal School; the Technical High School, which includes academic, pre-vocational and vocational work; the Emmerich Manual Training High School where academic and pre-vocational work is given, and the Shortridge High School, devoted to academic work. These three schools enroll more than thirteen percent of the total school enrollment of the city.

INDUSTRIES. Slaughtering and meat packing is one of the most important industries. The extensive stockyards cover more than 100 acres. Among the chief industrial establishments are architectural-iron and can works, belting factories, engine and boiler works, grain elevators, starch factories, medicinal laboratories, agricultural-implement works, terra-cotta and glass works, flour mills, printing and publishing works, carriage and wagon factories, fertilizer works, cooperage works, manufactories of canned goods and lumber and planing-mill products. Special mention should be made of the automobile and metal industries. These have recently had a great development. The city is also a port of entry and a point for the receipt and distribution of foreign as well as domestic commerce.

INTERURBAN TRAFFIC. Indianapolis being located in what is nearly the geographical center of the state, is the logical point for traffic distribution to most of the smaller industrial cities and towns of the state except those located on Lake Michigan and on the Ohio River. To serve this purpose, the city is noted among the inland cities of our country for its excellent system of interurban trolley lines by which every important city in the state can be reached. Thirteen lines radiate from Indianapolis, carrying in and out thousands of passengers daily.

HISTORY. The first settlement was made in 1819, and the place became the capital of Indiana in 1825, when the seat of government was removed from Corydon, the county seat of Harrison County. It was first incorporated in 1832, and the first capitol was completed in 1836. A city charter was granted in 1847. Population in 1920, U. S. census, 314,194.

Indian Archipelago, *Ar" ki pel' a go.* See MALAY ARCHIPELAGO.

Indiana, State Universities of. Indiana supports more than one institution of higher learning. They are:

INDIANA UNIVERSITY, at Bloomington (1828). It was opened in 1824 as Indiana Seminary, but chartered as a college in 1828, and as a university ten years later. It became coeducational in 1867. The institution has a fine campus and many excellent buildings. Besides its collegiate department there are schools of law and medicine. A summer school is also maintained, and a biological station on Winona Lake. Its library contains about 128,000 volumes. Its income amounts to over $700,000. There are more than 100 male instructors in its professional departments alone, and the enrollment is about 2500 students.

PURDUE UNIVERSITY, at Lafayette, established under the Federal ("Morrill") act of 1862 and endowed by John Purdue, was opened for students in 1874. It is supported by Federal and State appropriations; is co-educational, and devoted to those branches of technology related to Engineering, Agriculture and general Science. The faculty numbers 200; the student body 2500, with over 6000 graduates. The property of the University is valued at over two million dollars; and the annual income is two million, including the departments for Agricultural Research and Extension. The University has very extensive laboratories of engineering, chemistry, physics, and biology; a large farm with herds of pure bred animals and twenty-five main buildings. A unit of the Reserve Officers Training Corps, under the direction of the United States War Department, is maintained for instruction in Field Artillery. Its library contains some 35,000 volumes. Its graduate courses are largely attended.

Indian Marlow, or **Stampweed,** an East Indian plant of the Mallow Family, now naturalized in the United States. It is a branching shrub, growing from two to four feet high and bearing large

velvety leaves, which give it, locally, the name velvetleaf. The flowers open in July and have the same spreading, slightly bell-shaped corolla which characterizes the members of this family. There are five sepals, five bright yellow petals and many stamens. The fruit is similar to the "cheeses" of common mallow. Indian mallow is found growing in waste places, but a beautiful greenhouse variety is also well known. This cultivated mallow has five-lobed, long-stemmed leaves, and blooms at all seasons.

Indian Ocean, the large expanse of water south of the Continent of Asia, which forms its northern boundary. The ocean is bounded on the east by the Malay Peninsula and Australia and the intervening islands and by the Pacific, on the south by the Antarctic Ocean and on the west by Africa and the Atlantic. From north to south its length exceeds 6500 m., and it varies from 6000 to 4000 m. in breadth. The largest islands in the Indian Ocean are Ceylon, Madagascar and Mauritius. Monsoons and hurricanes are frequent throughout the region from December to April. The currents are less constant than in other oceans, being strongly affected by monsoons.

INDIAN PIPE

Indian Pipe, a leafless plant of the Heath Family, whose stem and flower are of a muddy white color; hence it is locally called ghost flower or corpse plant. It is found in the damp woods of the North, at the bases of decaying trees and stumps, upon which it feeds. The stem is fleshy and scaly, growing from three to ten inches in height and bearing a single, drooping, bell-shaped flower which appears in September. Its rarity makes it eagerly sought, but the pleasure lies in finding and not in gathering it, for the whole plant blackens soon after being picked.

Indian River, a tidal inlet on the east coast of Florida, flowing nearly parallel with the coast in Brevard and Volusia counties. It is about 100 m. in length; the width varies, as the river expands in some portions into extensive lakes and lagoons. It communicates with the sea by Indian River Inlet, and with Halifax River by a canal.

Indians, American, the name used by Columbus to designate the aborigines whom he found upon the discovery of the New World. He had the mistaken idea that the islands he discovered were a part of India and that these tribes were natives of that country. Much speculation has been advanced in regard to the origin of the American Indians and they have been said to have come from every part of the Old World. They are now believed to be of a distinct race and are not thought to be derived from any Eastern peoples. However this may be, it is certain that for many, many centuries the American continent has been the home of the race whose descendants are variously known as the American Indians, red men and the Amerinds.

Physical Characteristics. In many ways the American Indians seem allied to the Mongolian race. They are brown-skinned, the color varying from a reddish tint to a dark chocolate; their hair is long, dark, straight and coarse and their eyes are dark or hazel-brown. Their cheeks are prominent, their noses large and their foreheads high; their beard is scant. In stature the Indian varies from the tall, lithe build of the Sioux to the stocky shortness of the Eskimo, but the tall type prevails.

Tribes and Tribal Government. The Indians found by the explorers and

first settlers, though undoubtedly of one race, were of many tribes and clans. Those found in North America may be classed roughly in 13 tribes, whose names and geographical locations were practically as follows: the *Hyperboreans,* including the Eskimos, whose home was northern and eastern Canada; the *Athabaskans,* or *Athapascans,* who occupied central Canada; the *Thlinkeets,* who lived in Alaska and along the mountainous western slopes as far south as the present northern boundary of the United States; the *Algonquins,* who lived along the eastern coasts and south to North Carolina; the *Appalachians,* who occupied the eastern mountains and the regions south and west to Louisiana; the *Wyandot-Iroquois,* or *Iroquois,* who were found throughout the entire Great Lakes region and the eastern Mississippi Valley; the *Dakotas,* or *Sioux,* who ranged the great plains at the north; the *Shoshones,* who were their southern neighbors; the *Pawnees,* who occupied the desert region and east to the Mississippi; the *Pueblos,* who built their compact cities in Arizona and New Mexico; the *Columbians,* who fished and hunted in the streams of Washington and Oregon; the *Californians,* who lived west of the mountains and gave their name to the state which they occupied; and the *Yumas,* who wandered through southern and Lower California and Arizona or even crossed the river into Mexico.

Each of these tribes, having its individual laws, customs and legends, was made up of numerous subtribes and clans, which, though ready to aid each other in warfare, were none the less bound together in times of peace. The leader, or chief, of a tribe assumed his position according to a custom which differed with different tribes: in some the office was elective; in some, hereditary; and in some it was a right assumed because of superior strength, ability or cunning. The tribe was really a sort of family united by ties of more or less distant relationship and held together by a common religion and peculiar customs. As the authority of the father or grandfather was absolute in the home, so the rule of the patriarchs of the tribe was unquestioned; these patriarchs together formed a council which advised, supported and even overruled their chief in his acts of war and peace. The land which a tribe occupied was held as common property to be hunted over, fished over and, to some extent, cultivated, but it was never set apart as a possession of one individual or family. Between two tribes deadly feuds of long standing sometimes existed, usually arising from disputes over hunting rights, but more commonly hospitalities were extended, privileges were interchanged and peaceful gatherings were occasionally assembled.

Coming of Europeans. Whether or not the coming of the Norsemen was responsible for it, there seems to have crept into the legends of all tribes, hints of the coming of a White Spirit from across the Big Salt Water; thus the early explorers found a ready welcome, unstinted hospitality and even a sort of worship. Having no conception of private ownership of land, the Indians readily exchanged for baubles the use of their hunting grounds, but at the same time had no intention of giving up their own rights thereto. The point of view and the purposes of the incoming race differed so widely from those of the natives that only misunderstandings and warfare could ensue. Injustice upon one side met treachery upon the other, and thus the years of warfare are sufficiently accounted for. One of the ideals of the Indians seems to have been a complete federation of all the tribes at some future time, and no doubt part of its object was resistance to the advance of the whites. The league of the Iroquois, about 1459, said to have been brought about by the skill of Hiawatha, was a partial realization of the ideal and a universal peace was hoped for. The difficulty of uniting the different tribes and the rapid coming of the whites put an end to further federation, and this ideal was never realized.

INDIANS, AMERICAN

Religion, Legends and Beliefs. The religion of the Indian was a healthy, childlike worship of Nature, a belief that a spirit dwells in everything. The sun, the moon and the stars were the great spirits, but every glancing sunbeam, whispering wind and rustling leaf had its inhabitant that must be propitiated and pleased. The animals of the forest, too, were embodied spirits either of good or evil and as such were addressed in respectful or taunting terms before being attacked. Many rites and ceremonies resulted from these beliefs and are perpetuated even yet in the Ghost Dance, the Omaha Dance, the Sun Dance, the medicine-pipe ceremony and the rites performed when any youth of the tribe becomes of age. The medicine man was also the religious teacher, and in him rested the power of magic and the curing of disease by means of charms. The taking of scalps in times of war was the result of a belief that power over one's enemy, even after his death, lasted as long as some portion of that enemy's body was in his conqueror's possession.

Customs, Dress, Etc. Among most of the tribes woman was held in esteem in the home, but there her sway ended, since she could not hunt, trap nor wage war. In the wigwam she reigned supreme. She tended the corn, rice and tobacco, dressed the skins of the animals slain in the hunt, provided the firewood, drew the water, served the meals and practiced the arts of pottery and weaving. The "brave" cared for the education of his sons, hunted, fished and prepared his weapons for war or chase. The Indians' dress was the skins of animals and blankets woven from the fibers of plants, though woolen garments were not unknown. Their most elaborate costumes, heavily ornamented with beads, feathers and shells, were donned in connection with religious rites and ceremonies, and earrings, bracelets and necklaces added to the splendor of their showy display. Their money, so far as they used any, consisted of wampum, or beads made from the inside of shells and strung together (See Wampum).

Industries and Arts. Since the Indian lived chiefly by hunting and fishing, while game was plenty, agriculture was little practiced. Corn, rice and tobacco were the principal crops raised, although some tribes also cultivated such vegetables as pumpkins, squashes and melons. Implements for hunting and for this crude farming consisted of spears, knives, rude hoes, arrows and fishhooks, and were roughly manufactured by hand from flint, pipestone and sandstone. Their dishes consisted of bowls, ladles, kettles and spoons made from shells or hollowed from soft stone or even baked from clay. Among Southern and Western Indians especially, the making of pottery was an art, and relics of the skill of these tribes are highly valued. Aside from dishes, the bone needle seems to be about the only implement for indoor use. Sculpture and wood carving were practiced everywhere and formed a means of identification of clans, for the carefully designed totem poles were a sort of ancestral coat of arms; house carvings and purely ornamental designs were also not uncommon. The figures made generally represented animals or uncouth human figures. Beads were made from bits of shell, ivory, wood or bone, and when not used as a medium of exchange were made into belts and other ornaments. Body painting and tattooing were freely used among all tribes, and not only satisfied their desire for color but also served to express the seriousness of the occasion for which they were prepared; thus the red clay furnished the pigment for war paint, while varied shades of blue, yellow and green were used in religious rites.

Wherever there were materials with which to work, there were skillful weavers of baskets from fibers, rushes and grasses; in the North these were used in gathering berries, bark and herbs or were even the cradles of the little papooses; in the South they were used as household utensils. Blankets and mats of soft texture and fine quality were woven on outdoor looms whose frame was fastened to a forest tree; the Nava-

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hos still retain these arts and still engage in the manufacture of valuable blankets and rugs. The art of picture writing was not developed to the extent of the creating of a distinct system of writing, or hieroglyphics, except in Mexico, but late in the 18th century Sequoyah, whose name is perpetuated in a living monument of trees, invented an alphabet of the Cherokee language. Indian music was chiefly ceremonial, and rhythm was its chief characteristic. It was used in connection with all social, religious and civic ceremonies, and was produced by means of drums, whistles, flutes and rattles of skins and gourds.

Homes. The homes, or wigwams, varied much in structure, according to the tribe and the manner of living. The nomadic tribes built unstable brush huts or, in cold weather, dug subterranean pits. These ordinarily had no floor but the earth, and served only as apartments in which to eat and sleep. The more stationary tribes built their wigwams with more care, constructing them in a half circle about the larger wigwam of their chief. Each wigwam had a framework of poles tied together at the top and bent to form a rounding roof or left erect in the shape of a cone; this latter style is known as the tepee. The poles were covered with skins, bark and blankets which effectually kept out both cold and heat. The Iroquois constructed communal houses known as "long houses," in which each family had its separate, half-open compartment, and every five families had their common fire. The Pueblos constructed large, many-tiered cities, the primeval prototype of the modern flat, built in semicircular form, and capable of housing more than 100 families. Ascent to the upper doorways was accomplished by means of ladders placed outside of the structure, but on the inner side of the semicircle. These buildings were of clay or adobe and are spoken of as pueblos from the name of the tribe.

Education. The Indian as found by explorers cannot be said to have been uneducated. His knowledge of woodcraft, botany, zoology and physiography was wide, though natural rather than scientific. As is true of all dwellers in the open, his senses were keenly alert, his judgments clear and his mind active. This foundation could not fail to be a firm one upon which to build later a more formal training. Years with lack of opportunity for advancement, either naturally or by means of the white man's schools, have left their impression, and the Indian is mistakenly supposed to be unfitted for education. The contrary is, however, true. Many tribes have manifested marked talent for accumulating the culture of the whites and are making progress in the schools established for the education of the race. The annual expenditure by the government for the maintenance of Indian schools is over $3,000,000. This serves to support over 100 boarding schools and about 220 day schools. Aside from these there are mission schools, conducted by churches and various religious organizations. The most noted of these schools are the Chilocco Indian Industrial School in Kay County, Okla.; the Carlisle Government School at Carlisle, Pa.; the Hampton Normal and Agricultural Institute at Hampton, Va.; and the Haskell Institute at Lawrence, Kan. The Indian takes readily to training in manual arts and to literary and historical studies.

The Indian of Today. There are at present in the United States about 311,000 Indians, living chiefly in Oklahoma, Arizona, New Mexico, South Dakota, California, Wisconsin, Washington, Montana, Minnesota, North Dakota and Michigan. The five civilized tribes are named the Cherokee, Chickasaw, Choctaw, Creek and Seminole, and include about one-third of the Indian population. The Indian has rarely intermarried with other races and remains a race almost distinct. With the rapid settling of eastern United States he has been pushed westward until now few are left east of the Mississippi. By treaty the United States Government has established over 100 Indian reservations, or tracts of

land, still controlled by the National Government and protected by United States law. The immediate controlling power is an agent, or superintendent, appointed by the president and responsible to the commissioner of Indian affairs. The Federal Bureau of Indian Affairs is a part of the United States Department of the Interior. The largest reservation is that of the Navahos in Arizona, consisting of over 9,000,000 acres. Indians on the reservations are not citizens of the United States and become so only by adopting civilization and settling on land outside of the reservations. By accepting these conditions and taking the freeman's oath required of all voters, the male Indian has the right of suffrage. There are about 20,000 Indian voters in the United States. See *Handbook of American Indians,* prepared by the Bureau of American Ethnology.

Indian Summer, a local name for a brief season of pleasant weather in the Central and Eastern states of North America, occurring usually in October or November, according to locality. The period is marked by calms or by gentle breezes, a hazy condition of the atmosphere, warm days and cool nights. In Germany weather corresponding to this is known as Old Woman's Summer and St. Luke's Summer, and in England as All Hallow Summer and St. Martin's Summer.

India Rubber. See RUBBER.

Indictment, *In dite' ment,* a formal written charge against a person, in legal form, presented by a grand jury, and used later in court as the basis for trial of the accused. The essential features of a valid indictment are: that it be presented by the grand jury to some court having jurisdiction over the offense charged; that it be found a "true bill," signed by the foreman of the jury, and by the prosecuting attorney when required by statute; that it be framed with certainty, containing a description of the crime or misdemeanor charged, the name of the accused and, as far as possible, all the facts constituting the offense; and that it be written in the English language. See JURY, subhead *Grand Jury.*

In'digo, a blue dye obtained from a number of tropical plants of the Pulse Family. It was once widely used in the production of the color which has received its name. Since indigo has been produced artificially from coal-tar products, the importation of indigo is comparatively small. The indigo plants are perennial shrubs that grow to a height of about six feet and have compound leaves and pink or purple blossoms.

In the preparation of dye the plants are cut just before they blossom and are steeped in water for from 12 to 15 hours. The steeping vats are practically without air, and the fermentation which the stalks undergo there produces a liquid known as indigo white. This liquid is drawn off and churned violently until the muddy indigo blue forms, because of contact with the air, and sinks to the bottom of the vat. When this has fully settled, the liquid is allowed to run off and the indigo blue is collected, squeezed as dry as possible and further dried in air. It is sold in lumps or as powder. Indigo plantations were common in India, and the dye was brought in large quantities to the Mediterranean countries by traders from the East.

Indigo Bunting. See BUNTING.

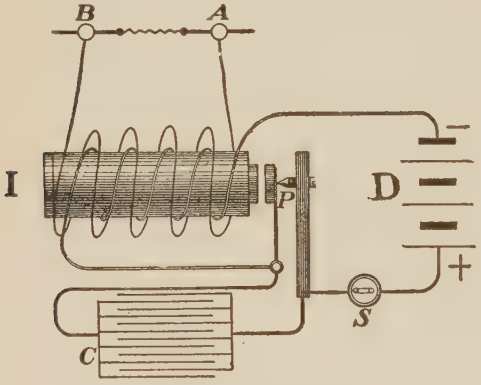
In'dium, a metallic element found in a number of zinc ores. It was discovered in 1863 by Richter and Reich, and is a lustrous silver-white metal, usually obtained by decomposing one of its oxides by means of the electric current. None of its compounds is of commercial value.

Indoor Baseball, a modified form of baseball played on a floor measuring not less than 40 by 50 ft., with a white ball 17 inches in circumference. The bats are an inch and a half in diameter and 33 inches long, while the bases are bags partially filled with sand, so that they will not too easily slide out of position. This game was originated in 1887

by members of the Farragut Club of Chicago. It is now played under rules formulated by a national association. See BASEBALL.

Indorsement. See NEGOTIABLE PAPER.

Induc'tion Coil, an instrument whose purpose is to transform a current from an ordinary battery into an intermittent current of high voltage. There are many different kinds, but all act upon the same principle. The ordinary induction coil consists of a primary coil of coarse insulated wire surrounded by a secondary coil made of many turns of very fine insulated wires. The core of the primary coil is made up of fine iron



INDUCTION COIL

wires. A current breaker, or interrupter, and a condenser also connect with the primary coil. By means of the first, the current in the primary coil is alternately made and broken, and the current induced in the secondary coil is capable of producing sparks between its terminals when separated. The number of turns in the fine wire and the iron core enables many lines of magnetic force to pierce the secondary circuit in the short time that the current is changing in the primary coil; thus a high voltage current results in the secondary coil. The condenser, which is connected in shunt to the break in the primary circuit, makes the break in the primary current more sudden, and hence causes a greater voltage to be generated in the secondary coil. The induction coil is variously known as Ruhmkorff's coil, the inductorium and a spark coil.

The diagram shows the usual connections of an induction coil. The battery, D, sends a current through the switch, S (when closed), through the contact point, P, around the iron core, I, and back to the battery. The magnetized core, I, attracts the little iron block resting against the point, P, and thereby breaks the primary circuit. A very high voltage current is induced in the secondary coil and a spark passes between its terminals, A and B. The condenser, C, connected as shown, causes the primary current to die out more rapidly when the contact at P is broken, resulting in a longer spark than could be obtained without it. When the primary current has died out, the block is no longer attracted and again makes contact at P and the process is repeated. A spark also occurs when the circuit is made at P, but it is not usually so strong as when the circuit is broken, since the primary current cannot rise to its full value as quickly as it falls to zero, when the circuit is broken. See INDUCTION, ELECTROMAGNETIC.

Induction, Electromagnetic. In 1831 Michael Faraday, an English physicist, discovered that if an electric current in one coil of wire is suddenly stopped or started, a momentary electric current is set up in a near-by coil, as shown by the momentary deflection of a galvanometer in circuit with it. This momentary current in the near-by coil, called the secondary coil, is opposite in direction for the starting, to what it is for the stopping of the current in the other coil, called the primary coil. A steady current in the primary coil produces no current in the secondary coil. But if either coil is moved, a momentary current is set up in the secondary coil; this momentary current will be in the opposite direction if the movement is reversed.

If a bar magnet is suddenly thrust into a coil of wire, a current is set up in the coil, which lasts only while the magnet is being moved and which re-

verses when the movement of the magnet is reversed. The current in the primary coil above produces a magnetic field, which is much the same as that above the permanent magnet, and it is the action of this magnetic field on the secondary coil which causes the momentary current. The general condition for induced electric currents can be stated as follows: An induced current is set up in a coil whenever there is a change in the number of lines of magnetic force passing through the coil. The greater this change in a given time or the shorter the time during which a given change occurs, the greater is the current induced in the coil.

It is possible that the primary coil might be so placed that none of its lines of magnetic force would pass through the secondary coil, in which case no current could be induced in the secondary coil by making or breaking the current in the primary. This is the case when one coil is placed inside the other and at right angles to it and, of course, when the two coils are very far apart. Likewise, if both poles of a bar magnet are simultaneously thrust into a coil, as when the magnet is moved sidewise, there is no current induced in the coil. The importance of Faraday's discovery of induced electric current cannot be overestimated, as on this principle practically all commercial electric currents are produced today. See INDUCTION COIL; TRANSFORMER; DYNAMO.

Induction, Electrostatic. When an insulated conductor having no charge upon it is brought near a positively charged body, it requires a negative charge on the side next to the positively charged body and a positive charge on the farther side. The two charges so acquired are called induced charges, and the process is called electrostatic induction. That these two induced charges are of opposite kinds can readily be shown. Touch a small insulated metal disk, called a proof plane, to the end of the conductor next the positively charged body and then hold the proof plane near a delicate electroscope and note the effect on the electroscope. Do the same for the farther end of the conductor. The effects produced on the electroscope will show that the induced charges are opposite in kind and that the induced charge next to the positively charged body is a negative one. That the two induced charges are equal in amount is evident from the fact that there was originally no charge on the conductor, and no charge will be found on it when removed from the vicinity of the positively charged body; the positive and negative charges exactly neutralize each other.

If while near the positively charged body, the conductor is momentarily touched by the hand or connected to the earth, it will be found that its positive electricity all disappears. The conductor is now negatively charged and will remain negatively charged when removed from the vicinity of the positively charged body. A conductor charged in this manner is said to have been charged by induction. The negative charge cannot be removed from the conductor while it is near the positively charged body by touching the conductor with the hand; the negative charge is attached, or "bound," as it is said, by the inducing positive charge. But when the conductor is removed from the vicinity of the positively charged body, the negative charge readily escapes if the conductor is touched by the hand. Electrostatic induction is the principle made use of in the electrophorus and in all modern electric or electrostatic machines. See ELECTROPHORUS; ELECTRIC MACHINE; ELECTROSCOPE.

Induction, Magnetic. When a bar of soft iron is held with one end in contact with the pole of a permanent magnet, or when it is held with one end near the pole of the magnet, it also becomes a magnet; that end near to or touching the north pole of the permanent magnet becomes a south pole and the other end becomes a north pole. Or if held in any strong magnetic field, as the magnetic field inside a long coil or helix of insulated wire carrying a pow-

erful electric current, the iron bar becomes a magnet. In all such cases, the iron bar is said to be magnetized by induction.

When removed from the magnetizing field, the soft iron loses most or all of its magnetism. If a bar of tempered steel is treated in the same manner, it is not quite so strongly magnetized as the soft iron while in the magnetizing field, but when removed from the field it retains its acquired magnetism to a large degree, and hence becomes itself a permanent magnet. The magnetism induced in the iron or steel bar when treated as above can be considerably increased by striking the bar with a hammer or otherwise jarring it while in the magnetizing field, or by heating it red-hot and allowing it to cool in the magnetizing field. See MAGNET.

Induc'tive Method, that method of reasoning or teaching which is based upon the earliest and most natural operation of the child's mind—that of observing, comparing observations and drawing conclusions based upon these. It is, therefore, the method necessarily followed in primary schools. It is frequently called the observational method; and it is used also by teachers of more advanced pupils, especially in subjects which lend themselves easily to laboratory methods, or when a topic new to the class must be presented. The normal child soon develops the habit of cooing and crowing with delight upon the approach of one who has gratified his desires. By inductive reasoning he assumes that enjoyable experiences associated with this person are about to be repeated. After placing one block upon another until he has quite a high pile, the child accidentally disturbs the bottom one, and the pile falls. He is astonished, but delight succeeds surprise, and day after day he piles up his blocks only to knock them down again. Thus he learns from observations based upon many experiments. It is Nature's way.

The kindergarten became successful largely because the instruction was by inductive methods. The success and extension of kindergartens revolutionized the methods of other primary schools. Today, the pupils of grammar and high schools, of colleges, universities and graduate schools are "learning by doing." Manual-training rooms, and rooms for the teaching of domestic science and domestic art, laboratories of botany, zoology, physics, chemistry and other subjects are well equipped. The teacher no longer *introduces* a subject by dictating rules, which the pupil must write out and commit to memory. He explains the materials that are to be used, points out in a general way about what results will follow from a certain procedure, and then sets the pupils to work for themselves. If capable of learning, and at all interested in the subject, they will soon begin to generalize; that is, to reason inductively, basing their conclusions upon the many observations made.

It is because of the marvelously rapid increase in the number of those reasoning from first-hand knowledge, and with that clearness resulting from personal observations of materials, forces and phenomena, that the past century has witnessed so great a development of the world's resources. There are, however, certain subjects which are essentially deductive in their nature. Moreover it is not always necessary for one with a well-trained mind to spend time in observation of phenomena, because he can deduce what he wants from the data made available by others. See DEDUCTIVE METHOD.

In'dus, the chief river of the northwestern part of Hindustan, separating India from Afghanistan and Baluchistan. It rises in Tibet, on the north side of Kailas, a Himalayan peak, and within a course of 500 m. flows through some of the most picturesque mountain scenery in the world, descends 11,000 ft., emerges on the plains of the Punjab, and finally wastes its waters through branching, shrinking streams on its long and devious route to the Arabian Sea. The principal tributaries are the Shyok, Kabul and the Panjnad. The delta extends inland about 130 m. Its fisheries

are excellent, and its waters are an important source for irrigation.

Industrial Education. See EDUCATION, INDUSTRIAL.

In'fant. See GUARDIAN.

In'fantry, that part of an organized army that is trained to rapid evolutions and always fights on foot. Infantry is the oldest form of army organizations, cavalry not coming into prominence until the Age of Chivalry. Previous to the invention of firearms, the weapons of the infantry consisted of the bow and arrow, the javelin and the spear. In the Greek and Roman armies the infantryman carried a shield which was attached to his left arm. The organization of the infantry varied in different armies. The phalanx of the Greeks consisted of a body of 10,000 to 20,000 men, eight to sixteen ranks in depth and either forming a triangle with the apex towards the enemy or a solid rectangle. The Roman legion numbered 4500 and was divided into infantry and cavalry, but the latter numbered only about 300.

Industrial Workers of the World, popularly known as the I. W. W., the name of a labor organization of revolutionary tendencies, organized in Chicago in 1904. The strength of the organization has centered about the lumber, textile and mining industries, though its influence has been felt more widely. Its belief is that the working classes and the employers have nothing in common, that the workers must organize and struggle on until the wage system is abandoned.

Infec'tious Diseases, those diseases which are caused by the entrance and growth of any bacterium in the body. The germ which causes any of these diseases has a specific form and a peculiar method of growth which distinguishes it from all other disease germs, and by means of which it may be recognized. The germs of cholera, diphtheria, scarlet fever, smallpox and typhoid fever have been isolated, and in most cases each has been successfully combated with its particular antitoxin.

The term *infectious diseases* is frequently used in a popular sense to refer to those diseases whose germs are transmitted through the breath or pass out of the body and enter drinking water or milk and are thus spread. In this connection it is distinguished from the term *contagious diseases,* which refers only to those spread by actual contact with a person having the disease.

Influenza, *In"fluen'za,* or **Grippe,** *Grip,* a disease brought on by exposure to cold. Its symptoms are those of a severe cold in the head. Fever, nausea and general depression are also symptoms.

In"fuso'ria, the highest group of Protozoa (See PROTOZOA). All the tiny animals which were discovered in infusions of vegetable matter, such as hay, dried leaves, etc., were once called Infusoria. Later the confines of the group were more closely marked and it was limited to include only three classes. The Infusoria all have definite form, are surrounded by an enclosing, external membrane and bear, near the mouth opening, one or more hairlike projections, which aid them in their movements and assist in directing particles of food toward the mouth. The single cell of protoplasm, which makes up the entire structure, has both mouth and anal openings, one or more nuclei and a vacuole, which continually contracts and expands. All Infusoria are aquatic and if subjected to drought form a hard, dry particle which revives upon being placed in water; this fact no doubt accounts for the old theory of their spontaneous generation. They are found in abundance in any stagnant water and especially in that which stands exposed to the sunlight. Infusorial earth, or kieselguhr, is composed mostly of diatoms, and was given its present name before the nature of Infusoria was known. See DIATOM.

Infusorial Earth. See INFUSORIA.

In'galls, John James (1833-1900), a United States senator, born at Middleton, Mass. After graduating from Williams College in 1855, he studied law, and was admitted to the bar in 1857. The next year he moved to Kansas be-

cause of his interest in the anti-slavery movement there, and quickly became identified with public affairs. He entered the State Senate in 1862, was editor of the Atchison *Champion* for three years, and went to the United States Senate in 1873, where he served until 1891, being president *pro tem.* in 1887.

Ingelow, *In' je lo,* **Jean** (1820-1897), an English poet and novelist, born in Boston, England. She was a writer of songs and ballads, but though her verse was exquisitely sweet, it was always conventional. Among her best-known poems and novels are *The High Tide on the Coast of Lincolnshire, Divided, John Jerome, Off the Skelligs* and *Fated to Be Free.* She also published *Studies for Stories* and *Stories Told to a Child.*

Ingersoll, *In' ger sol,* **Robert Green** (1833-1899), an American lawyer, politician and public speaker. He was the son of a Congregational minister and was born in Dresden, N. Y. His people came to Illinois in 1845, where Robert received a common school education. He was admitted to the bar in 1854 and was soon prominent both as a lawyer and as a politician in the Democratic Party. When the Civil War broke out he organized a troop of which he was the colonel, and served in several engagements. He was taken prisoner, but was finally paroled, after which he resigned his commission and returned to Illinois, where he again entered politics, this time as a Republican. Ingersoll became the attorney-general of Illinois, and at the Republican National Convention of 1876 he nominated Blaine for the presidency in a speech which brought him instant fame as a public speaker. From this time on his services were in demand as a lecturer. Ingersoll was an agnostic, and many of his most famous speeches and writings were directed against the Bible and the teachings of Christianity. His speeches were brilliant and rhetorical. Among his writings are *Some Mistakes of Moses, The Gods, Prose Poems, Ghosts, Foundations of Faith* and *The Bible;* the most of these were first given as lectures.

Ingres, *An'gr',* **Jean Auguste Dominique** (1780-1867), a French historical and portrait painter. He won the Prize of Rome with his picture *Achilles Receiving the Messenger of Agamemnon.* After studies in Rome, he returned to Paris and became the leader of the Classicists. He lacked originality, but was an excellent draughtsman, and as such exercised a profound and lasting impression upon the French School. Among his works not previously mentioned are the *Vow of Louis XIII, Apotheosis of Homer, Stratonice, Cherubini Inspired by the Muse* and numerous portraits. Among the latter is a portrait of Napoleon Bonaparte.

Inher'itance Tax. See TAX, subhead *Inheritance Tax.*

Initiative, Referendum and Recall, measures which have for their purpose the submission of legislative matters and the acts of public officials directly to the vote of the people.

INITIATIVE. The initiative is a law which compels a legislative body, upon the presentation of a request signed by a certain number of voters, the percentage being specified in the statute, to place upon its passage the measure contained in the request. In other words, the initiative may be considered as a mandatory petition. A legislative body may use its pleasure about acting on a petition, but it must act on an initiative. The initiative may be used locally to compel action by a city council or as a state measure to secure action by a Legislature. It secures action on measures desired by the people.

REFERENDUM. The referendum is a popular vote upon a measure passed by a legislative body or upon a public policy submitted to the people for approval or rejection. The referendum vote is final, and a measure passed by a legislative body and rejected by a referendum vote would become ineffective. It places in the hands of the voters the power to control legislation, and it frequently defeats measures not in the interest of all the people. The referendum is of earlier origin than the initiative. It is applicable

to the government of a city, state or nation. Its most general application is to the amendments of state constitutions. In all states except Delaware, an amendment must be submitted to the people for adoption.

Local option laws, which require the submission of the question for or against license, furnish another illustration of the referendum, and a third is the submission to popular vote, the question of issuing bonds for public improvements. The referendum has a national application in Switzerland and the national legislative body passes but few laws.

The initiative and referendum provide for direct legislation by the people and compel legislative bodies to submit to the wishes of the majority. In 1912 they were in force in over 200 cities and 25 states, and were a part of the fundamental law of the state in over 20 states.

RECALL. The recall gives the voters the power to depose an undesirable official before the expiration of his term of office. By the signing of a petition by a certain number of voters who voted for the official, demanding another election, such election must be called. In this election the official is on the same footing as when he first ran for the office. If defeated, he must retire. The recall is operative in all the Pacific States and in a number of others. The first constitution of Arizona contained a provision for the recall of judges, but because of objections on the part of the National Government, that clause was stricken out. Later, however, the Arizona Legislature adopted an amendment providing for the recall of the judiciary. In 1911 California voted for the recall of the judiciary.

ARGUMENTS FOR. Those favoring the initiative, referendum and recall sustain their positions by the following arguments: (1) The initiative gives the people the opportunity to demand legislation direct; it is a mandatory substitute for the petition; it gives the people the power to enforce the enactment of good laws. (2) The referendum refers the measure to the people for their decision; it enables the people to make ineffective, laws designed to favor special interests or to work hardship upon any part of society; it gives the voter more direct interest and increased responsibility in the affairs of government. (3) The recall gives those who elect an individual to office the right to recall him if he proves to be corrupt or incompetent; it prevents special interests from electing and retaining in office those favoring these interests as against the interests of the citizens at large. The operation of the recall is necessarily deliberate and prevents hasty action.

ARGUMENTS AGAINST. Those opposed to these measures bring the following arguments to bear against them: (1) They are all the result of popular clamor without any good reason back of it, or the result of "democracy gone mad." (2) By removing authority and responsibility from the Legislatures, they make them "mere bureaus of registration." (3) Independence in office and stability, assured by a fixed term of service, are essential to the fearless discharge of official duties, and the recall deprives the office of these essentials. (4) If officials prove incompetent or corrupt, the law provides a remedy through impeachment and removal from office by an impartial court. See IMPEACHMENT.

Injunc'tion, a civil writ or decree of a court of equity by which a person, firm or corporation named therein is forbidden to do a certain thing, or is forced to perform an act which as a matter of justice should be done for the benefit of another. An injunction is temporary, provisional or preliminary until the coming of the defendant's answer; if the court is not convinced by such answer the injunction is made perpetual. The violation of an injunction constitutes contempt of court and is punishable either by fine or imprisonment, or both, in the discretion of the court.

Ink, the colored liquid used for writing, drawing and printing. It has been in use since the earliest times of which there are records, for the papyrus rolls

which bear the marks of the greatest age were written upon with ink, and the characters traced by some sort of pen. Examination of these rolls shows that the foundation of the ink used was carbon mixed with gums and oils. In the 14th or 15th centuries iron and nutgalls began to take the place of carbon. Ink was then generally made by the housewife, who had her recipes and put up bottles of ink as she did her bottles of cordial. Inks now used are chiefly sepia inks, or those prepared from a secretion of the cuttlefish, *sepia*; India ink, of which the basis is carbon; and the various writing fluids of American manufacture. Black writing fluid is prepared by various recipes which use iron sulphate and nutgalls with logwood, indigo or ammonium vanadate added, according to the intensity of black desired. Fountain-pen inks are generally made from aniline dyes, as these form no sediment which will clog the pen.

Red inks are prepared by the use of cochineal, carmine or brazilwood, or by the magenta or eosin of aniline dyes. Copying ink requires a thickening substance in addition to the regular ink. Indelible ink is made by dissolving silver nitrate in ammonia water and adding a thickening substance. This ink can be removed, however, by use of potassium cyanide. Sympathetic inks, those which are colorless in a dry state but become visible when heated, are generally made so by the use of lead acetate or cobalt nitrate. The inks used for printing are preferably carbon inks and are made from lampblack and linseed oil. Ink powders are merely the dried constituents of ink ready for use as soon as moistened. Consult Lehner, *Ink Manufacture;* Mitchell, *Inks, Their Composition and Manufacture.*

Inland Waterways. See Atlantic Coast Canal; Chicago Drainage Canal.

Inn'ess, George (1825-1894), an American landscape painter, born in Newburgh, N. Y. In 1843, after having received some instruction in drawing, he began a close study of nature, making numerous sketches. His subjects were sunrises and sunsets, scenes wrapt in twilight and others depicting moonlight. Enchanting atmospheric effects, poetic charm, luminosity and luscious color are distinguishing characteristics of his work. His pictures are to be found in all the large galleries of the United States and in Europe. The Art Institute of Chicago contains a large collection of them. *Under the Greenwood, Autumn Gold, Close of a Stormy Day, Pine Groves of Barberini Villa* and *Tenafly Oaks* are among his most notable works.

In'nocent, the name of 13 popes.

Innocent III was the greatest pope of the name. His election occurred in 1198, when he was but 37 years of age, and he remained in authority until his death 18 years later. Innocent III was a man of unusual executive ability, and he used it to unite the Church and to increase papal authority. Some of the notable acts of his pontificate were: the conclusion of treaties with the Tuscan cities to the mutual protection of the cities and the rights of the Church; the excommunication of Philip Augustus of France until he should receive back his wife, Ingeborg, whom he had repudiated; the victory over John of England, who had refused to accept Langton as Archbishop of Canterbury, but who was finally forced to submit and to hold England and Ireland as fiefs of the Pope; the compulsion of Sicily, Hungary, Poland, Norway and Dalmatia to pay him homage; and the accomplishment of the Fourth Crusade, which, however, never reached the Holy Land, and the Crusade against the Albigenses. Innocent is one of the great men of history, and the influence of his personality was long felt. He brought to his work a constant devotion and an earnest desire for the spiritual welfare of his people.

Innocent IV was pope from 1243 to 1254. His years of authority are chiefly marked by the conflict with Emperor Frederick II. He is compared to Innocent III in his zeal in extending papal authority. It was he who introduced

the custom of bestowing the red hat upon Roman cardinals as a symbol of their willingness to shed their blood in the cause of the Church.

INNOCENT VI was pope from 1352 to 1362. He was an eager reformer and did much to reduce the luxury of the papal court. He urged the clergy to reside in their sees, and interfered creditably in the political affairs of Venice and Genoa and of England and France.

INNOCENT XII, pope from 1691 to 1700, is best known for his various ordinances against begging, gambling and extravagance; against judges receiving presents from suitors; and against nepotism, or the appointment of relatives, in the papal office. He was one of the most kindly and just of modern popes.

I'no, daughter of Cadmus and Harmonia, and wife of Athamas, King of Thebes, by whom she had two sons, Learchus and Melicertes. Through Juno's malice toward Ino, Athamas was driven mad and killed Learchus, while Ino herself, fleeing with the remaining small son from her husband's frenzy, sprang from a cliff near Corinth, into the sea. In pity the gods made mother and son sea deities under the respective names, Leucothea and Palæmon. Sailors invoked them to prevent shipwreck.

Inquisition, *In" kwi zish' un,* a Roman Catholic tribunal of judicature for the extirpation of heresy, dating from the 13th century. It is known officially as the Holy Office. Heretical teachings, which were disturbing southwestern France, were the immediate cause for this famous tribunal. It was mainly in charge of the Dominicans, and its power inspired more respect than that of any royal potentate.

In 1492 Ferdinand and Isabella of Spain were greatly disturbed by the Jews, who threatened to overrun their kingdom. They were a power, active and rich, and it was impossible to assimilate them to Christianity. Efforts centered on the Moors were equally futile. Spain had countenanced no violence against these peoples; but when attempts against the government became too numerous (the Jews tried in 1473 to buy Gibraltar), they petitioned Rome. They wished to establish a court against heretics from which, being sanctioned by the Church, there would be no appeal. Unsuspectingly Pope Sixtus IV granted this favor, whereupon the King and Queen selected their own Grand Inquisitors, two Dominicans with the Queen's councilor and chaplain, and immediately proceeded to turn the Inquisition into a civil court. From the very start everyone submitted to its wrongs, its cruelties and extortions. The King eagerly sought to increase its powers, for all confiscations went into the royal coffers. During its three-hundred year sway, the Inquisition decreed about 4000 deaths. But its verdicts were no more rigorous than those of other courts of the time; while to its credit is the fact that its prisoners received the best treatment accorded in Europe, and that it alone decided that contrition made atonement for criminal offenses.

Sixtus IV soon saw his error in having sanctioned the Spanish Inquisition. He declared that its object had been misrepresented to him, and therewith set about to throw all possible stumbling blocks in its way. To lesson its severity, if possible, he constituted himself a final court of appeal from its decrees. Though frequently suppressed, the Inquisition was not fully abolished until 1834. The State Inquisition was a scandal; but the Church tribunal gave assurance to all that they could rely on its justice. The Roman Inquisition was never positively known to punish by death, political disqualification or imprisonment being the limit of its rigor.

The Holy Office today deals almost entirely with suppressing heretical literature.

Insane, Care of the. Proper care of the insane dates from the beginning of the 19th century. Previous to that time they were regarded as criminals or as buffoons and treated accordingly. Since 1847 remarkable progress has been made in the treatment of these unfortunates. Hospitals for the insane are of three kinds: those established by and under

direct charge of the government; those endowed by wealthy philanthropists and usually under the supervision of a board of trustees; and private institutions, in which fees are charged for the treatment given. In the United States all hospitals for the insane are under the supervision of the authorities of the state in which they are located. In modern hospitals cottages have taken the place of the large buildings formerly used, and patients are placed among homelike surroundings and have the service of physicians who are skilled in the treatment of nervous diseases. Patients are committed to state hospitals only on the order of an examining board of physicians appointed by the state.

Insan'ity, a general term used to designate several forms of mental disorder. These disorders are sharply divided into two distinct groups, congenital insanity and acquired insanity.

Congenital insanity, which is due to imperfect brain development, is generally known as idiocy or imbecility. In idiots the senses of taste, touch and smell are below normal, and unnatural or irregular formation of one or more organs is not uncommon. Idiots and imbeciles are not dangerous or violent, but dull; and although they may, with assistance, perform the routine acts tending to self-preservation, they are incapable of much intellectual development.

Insanity is rapidly increasing among civilized peoples. Among the uncivilized it is entirely absent. This fact and the fact of its greater frequency in cities has led to the theory, now generally accepted, that the more strenuous struggle for existence consequent upon competition in these centers causes a breaking down of the nervous system. About 50 per cent of the cases of insanity are curable. There are many hospitals for the treatment of the insane and feeble-minded. These institutions are usually under state management, and inmates are cared for at public expense.

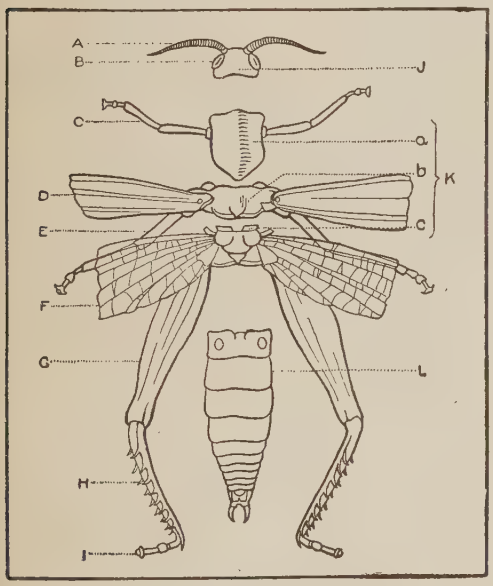
Insec'ta, one of the great subdivisions of Arthropoda and, with the possible exception of the one-celled animals, the largest group of the animal kingdom. There are over 250,000 species known and classified at present, and, no doubt, many others are as yet unknown. In general, members of this class have three pairs of legs and two pairs of wings; the body divisions are three, head, thorax and abdomen, and are together composed of 17 segments. The body is frequently covered by a stiff, protective sheath, called the chitin. Upon the head are one pair of antennæ, or feelers, and one pair of compound eyes. Breathing is by means of tiny openings, called spiracles, which lead directly into the trachea.

Insects are of incalculable assistance to man; they produce shellac, cochineal, silk, gallnuts, honey, beeswax, certain acids and many other important commercial products. The bees, moths, and butterflies aid in the fertilization of many flowers, which without them would not reproduce. On the other hand, many insects are very harmful. Flies and mosquitos carry disease; grasshoppers, cicadas and katydids do great harm to growing crops; beetles and caterpillars destroy plants, wood and clothing; and many other insects are annoying and cause personal discomfort by inflicting painful wounds or merely by their insistence.

The life history of the insect is considered complete if made up of four stages: the egg, the larva, the pupa and the adult. These stages are known by different names in different classes; for instance, the larva of the butterfly is generally known as the caterpillar; of a certain moth, as the cutworm, etc. Some insects pass through only two or three of these stages and are then said to have an incomplete metamorphosis. A scientific classification of insects makes 19 divisions and, no doubt, there are others to be added. In the list given below, the seven commonly-known divisions are printed in small caps. The groups of insects and a representative of each group are as follows:

Thysanura .....Springtail
Ephemerida.....May Fly

Odonata	Dragon Fly
Plecoptera	Stone Fly
Corrodentia	Book Lice
Isoptera	White Ant, or Termite
Mallophaga	Bird Lice
Euplexoptera	Earwig
Orthoptera	Grasshopper
Physopoda	Thrips
Hemiptera	Cicada
Neuroptera	Ant Lion
Mecoptera	Scorpion Fly
Trichoptera	Caddice Fly
Lepidoptera	Butterfly
Diptera	House Fly
Siphonaptera	Flea
Coleoptera	Beetle
Hymenoptera	Bee, Ant



PARTS OF AN INSECT

A, Antenna. B, Eye. C, Foreleg. D, Forewing. E, One of the middle pair of legs. F, Hind wing. G, Femur of hind leg. H, Tibia with spines. I, Foot. J, Head. K, Thorax, with its three divisions: a, prothorax; b, mesothorax; c, metathorax. L, Abdomen.

The seven groups ordinarily known are discussed in this work under their respective titles. See Arthropoda; Crustacea; Myriapoda; Arachnida; Zoology, subhead *Classication*. Consult: Fabre, *The Life and Love of the Insect;* Kellogg, *Insect Stories* and *American Insects;* Allen, *Flashlights on Nature;* Badenoch, *Romance of the Insect World;* Foot, *Insect Wonderland;* Rennie, *Insect Architecture.*

Insecticide, *In sek' ti side,* an agent for destroying insects. It may be a poison spray, an adverse condition of temperature or even an insect with murderous tendencies toward other insects, but if its effect is fatal to the insect pest it may be classed as an insecticide. The term is generally used to refer to those agents which destroy harmful insects and therefore aid the farmer, gardener or floriculturist. Persons in these professions and even amateur plant growers do not need to be told of the necessity of finding some means of protecting all growing things against insect pests, but the extent of the damage done by the tiny creatures may not be known. The Yearbook of the United States Department of Agriculture (1904) states that the annual loss caused by insects in the United States exceeds the entire expenditures of the Federal Government, including pensions and the maintenance of the army and the navy. In a more detailed account the damage to growing grain, cotton, forage crops, tobacco, garden crops, orchards, forests, live stock and stored products is estimated at over $1,000,000,000. It is well, therefore, that any agriculturist, no matter how small the range of his endeavors, should have a fair knowledge of how to protect his crops.

It is a well-known fact that most insects are practically harmless in the regions in which they are native, for there climatic conditions and other natural enemies hold them in check; it is when these insects have been carried by wind, train, carriage or ship to localities where the adverse conditions do not exist, that they become numerous and obnoxious. The modern method of discovering means of exterminating them consists not only in studying their present habits but also in learning from what country they come and the conditions that there checked their spread. In an article of

this character it is impossible to give methods of treatment for all pests upon all crops, since these vary so greatly, according to the insect, the crop and even the season.

NATURAL INSECTICIDES. *Insects.* The feelings of the farmer who lost one crop after another and finally in despair ordered his men to "kill everything that crawls" can be easily appreciated, and yet his commands, if carried out, would have been as bad as though he had ordered the wheat burned to destroy the chaff. Some of man's chief aids are those that crawl. Those whose presence should be welcomed by the farmer and which should be recognized and preserved are: the firefly, which destroys both weeds and injurious insects; the ichneumon fly, an enemy to caterpillars; the lacewing fly, an enemy to plant lice; the ant lions; the dragon flies; the searcher beetles; and the ladybugs. All of these should at least be encouraged and saved from wanton destruction. However, it is never advisable to introduce a foreign insect into farm or garden without expert advice, for the cure may prove more harmful than the disease.

Birds. Among the most efficacious natural insecticides are the birds, and, while a few are themselves pests, there is only one, the sparrow, which can be said to be wholly a nuisance. This sparrow, by the way, was introduced originally as an insect destroyer and has become a pest through driving away other valuable birds and eating more grain than it does insects. Among the birds that are chiefly to be encouraged are: the blackbird, which haunts the cornfield for grubs more than for corn; the bluebird; the bobwhite, which feeds upon the chinch bug and the potato bug; the chickadee, that destroys the eggs of the canker-worm; the crow, also a visitor of the newly-plowed field; the cuckoo, that eats the tent caterpillars; the grosbeak, sometimes called the potato-bug bird; the gull; the hawk, an enemy to grasshoppers; the humming birds; the jackdaw; the longspurs; the martin; the meadow lark; the nutcrackers; the nuthatches; the oriole; the owl; the robin; the skylark; the swallow, called the police of the air; all members of the Titmouse, Warbler, Vireo and Wagtail families; the woodpecker; and the wren. These are all friends to the farmer, and though they may be caught doing occasional damage, the good they do far outweighs it. In fact, the bird that pecks the cherries and mars the apple is more likely to be taking out the grub that is feeding within than he is to be feasting on the fruit. See BIRDS, subhead *Value.*

Other Animals. Among the less pleasing but equally active foes to insects are such animals as lizards, moles, salamanders, shrews, skunks, spiders, toads and weasels. Some of these, however, are not wholly harmless or desirable visitors, but the good they do accomplish should be credited to them.

Other Natural Insecticides. Among the hindrances which keep down in one locality the insects that flourish in another may be mentioned adverse conditions of temperature and moisture, bacteria, fungi and plenty of air and sunlight. Of these none can be cheaper than the last mentioned and none is more efficacious in driving out clothes moths and carpet beetles.

ARTIFICIAL INSECTICIDES. The use of artificial insecticides is almost unavailing unless some knowledge is had of the insect whose extermination is desired. For the purposes of this article insects may be grouped in one of two classes: biting insects, that chew the leaves and tissues of plants; and sucking insects, that merely feed upon the juices. It is obvious that while poison sprays or powders would destroy those of the first class they would have no effect whatever upon those of the second. The first necessity then is to find out something of the structure and habits of the enemy. Other means of identification not being at hand, a specimen may be sent to the state agricultural college or to an experiment station, where assistance in naming and exterminating the insect will be readily given.

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INSECT FRUIT PESTS

1. Apple-flower Beetle
2. Twig Pruner
3. Vine Pruner
4. 5. Apple Chafers
6. Raspberry Beetle
7. Plum Borer
8. Cherry Fly
9. Fruit Tree Bark Beetle
10. Apple Roller
11. Apple-tree Web Moth
12. Grape Roller
13. Spring Worm Roller
14. Grape Pruner
15. Cherry Slug
16. Plum Saw-fly
17. Social Pear-leaf Wasp

INSECTICIDE

The commonest and most harmful of the *biting* insects are:

Army Worm	Cutworm
Beetle	Fig Moth
Borer	Grasshopper
Brown-Tail Moth	Gypsy Moth
Cabbage Worm	June Bug
Cankerworm	Leaf Beetle
Caterpillar	Locust
Cockchafer	Oriental Moth
Cockroach	Potato Bug
Codling Moth	Sawfly
Cotton-Boll Weevil	Tomato Worm
Cotton Worm	Tussock Moth
Cricket	Webworm
Curculio	Weevil

Of the *sucking* insects:

Aphid	Hessian Fly
Botfly	Louse
Cattle Tick	Mealy Bug
Chinch Bug	San José Scale
Cottony Maple Scale	Scale Insect
Flea	Squash Bug
Fly	Stink Bug
Gadfly	Thrip
Harlequin Bug	White Fly

For those of the first class, poisons are effective. They may be applied as powder or as a spray, but should not be of such strength as to kill the foliage or to shrivel the fruit. They are easily washed away by rains and do not affect the eggs; for this reason, to be thorough in their effect they must be applied rather frequently. The poisons used most universally are Paris green, arsenate of lead and Bordeaux mixture. The formula for the latter is given under FUNGICIDE. Arsenate of lead comes in the form of a paste and should be applied as a spray by using one pound in ten gallons of water for potato bugs; one pound in 50 gallons for ordinary purposes, for small caterpillars and slugs; and one pound in 25 gallons for more pernicious pests. Paris green is more economical than arsenate of lead, and for orchard work is equally effective. It should be used in the proportion of one pound in 50 gallons of water for potato bugs; one pound in 125 gallons for fruit trees; and one pound in 150 gallons for young caterpillars or on trees with sensitive foliage. These three insecticides are applied with spray pumps, many varieties of which may be found upon the market.

The contact poisons which are to be used against sucking insects are more numerous, but on the whole less effective. They act by direct action on the body of the insect, either by closing the breathing pores, penetrating the body pores or actually eating away the body. Soap mixtures mat the protective hairs and are therefore more effective when applied in a thick, slimy suds. Dry powders such as tobacco and hellebore, which are sprinkled upon the foliage and upon the insects, should be very fine, since they are designed to enter the breathing tubes and the stomach and cause convulsions; even road dust, if fine enough, will have the same effect. Coarse particles are wholly useless.

For plant lice, one of the most numerous pests, pyrethrum, or Persian insect powder, may be dusted upon the plants through a sieve, with a bellows or, when made into a decoction of one ounce to two quarts of hot water, by means of an atomizer. Pyrethrum loses strength in the air and is expensive for general use. Tobacco may be applied frequently as a dust, as a decoction (one pound of chopped stems boiled in a gallon of water until the resulting liquid is dark brown) or as a fumigant, that is, by burning in the presence of the plants. In orchards the ground tobacco is often spread thickly in a trench six inches deep, about affected trees. Soaps of all kinds are excellent, where the foliage may be washed. An ounce of soap to a quart of water is the ordinary proportion; a solution of double the strength is sure to destroy all plant lice but is likely to affect the foliage as well. Care must be taken, too, not to allow much of the suds to collect on the surface of the soil, as the alkali will be detrimental to the growth of the plants. Whale-oil soap is especially good for orchard work, but the strength of the solution must vary with the insect to

be exterminated. For San José scale and other scale insects, two pounds in a gallon of water is a good mixture.

Kerosene emulsion is another effective insecticide and is prepared according to the formula: kerosene, two gallons; water, one gallon; hard soap, one-half pound. To prepare, the soap is shaved fine and powdered in boiling water; the kerosene is slightly warmed and added. The mixture is then churned by pumping it back and forth for five minutes into the pail by means of a force pump having a fine nozzle. After it cools the emulsion hardens to waxy consistency and may be diluted with soft water when desired for use. If well made, the mixture will keep for several weeks in a cool, dark place. When diluted with 12 to 15 times its bulk of water it is an especially good insecticide for sucking insects.

The above mentioned are but a few of the commonest means of exterminating harmful insects. As suggested, the safest method is to learn the name and habits of the insects that are attacking or may attack the crop, and then consult bulletins of the state or Federal departments of agriculture. Books that may be of assistance are: John B. Smith, *Our Insect Friends and Enemies;* Sanderson, *Insect Pests of Farm, Garden and Orchard;* Saunders, *Insects Injurious to Fruits;* Theobald, *Insect Pests of Fruits;* and Forbes, *Report of the State Entomologist* on *Noxious and Beneficial Insects of the State of Illinois.* Some means of extermination are discussed under the various insect titles. See BEDBUG; CANKERWORM; CARPET BEETLE; CHINCH BUG; CLOTHES MOTH; COCKROACH; CODLING MOTH; COTTON-BOLL WEEVIL; CURCULIO; SAN JOSÉ SCALE, etc.

In"sectiv'ora, an order of small-sized, flat-footed Mammals, whose food consists almost entirely of insects in their adult and larval forms. The habits of the members of this group differ widely, since many are subterranean, some are aquatic and some live in trees. They are found in all parts of the world except South America and Australia, and are generally ceaselessly active though slow. All are useful because they keep down the number of insects which would otherwise overrun vegetation, kill serpents which are poisonous to man though harmless to the Insectivora, and stir up the close-packed earth with their tunnels. The commonest of the Insectivora are the moles, shrews, shrew moles and hedgehogs. See MOLE; SHREW MOLE; HEDGEHOG; STAR-NOSED MOLE.

Insol'vency. See BANKRUPT LAW.

Insom'nia. See SLEEP.

In'stinct, the faculty of producing certain results without foresight as to those results and without previous training in their performance. The spider's knowledge of the purpose of its spinnerets, the snake's use of its venom, the kitten's defense with its claws,—these are instinctive and, apparently, are as well done the first time as any time. Instincts among the higher animals are oftentimes scarcely separable from intelligence, as the care of the collie for the sheep and the cunning of the cat in securing food. Man, the highest of animals, has by far the greatest number of instinctive impulses, but, owing to his memory and power of reflection, after having performed them once they cease to be instinctive and are accompanied by an expectation of consequences and a general line of reasoning in regard to the act itself.

Instincts seem to exist for the purpose of forming habits, and once this purpose is accomplished, the instinct is apt to die out. It is also true that if instincts find no vent they die readily, as the canary kept in a cage loses its nesting instincts so that they do not return even after its release. So the boy kept apart from his playmates, at the age when games, sports and rivalries would tempt him, loses all instinct for social plays and probably never feels the desire for them. Pedagogy has learned from psychology that there is a special time at which skill along various lines may be easiest acquired and that "striking

when the iron is hot" is the best principle to follow. The power of detecting the moment of "instinctive readiness" is a mark of the successful educator, for knowledge begun then never loses its significance, while a habit then formed is of far greater breadth of usefulness than one acquired slowly and impatiently because its time has gone by. See HABIT.

Insur'ance, a contract under which one party, called the insurer or underwriter, agrees for a specified consideration to pay the other party, called the insured, or his heirs or assigns, a certain sum in case of fire, accident or death. The contract is called the policy; the property or interest protected, the insurable interests; the events which might occasion the loss constitute the risks; and the rate paid by the insured is the premium. According to insurable interests which it covers, insurance is classified as fire insurance, marine insurance, life insurance, accident insurance, crop insurance, and so on.

COMPANIES. All insurance companies belong to one of two classes, mutual companies and stock, or proprietary, companies. In mutual companies the risks are assumed by the members, who are the policy-holders, and only sufficient premium is charged to pay losses and the running expenses. Certain companies that insure farm buildings, and fraternal orders, such as the Modern Woodmen of America, are respectively good examples of mutual fire and life companies. The stock, or proprietary, companies are more numerous, and many of them are much larger than any mutual companies. The proprietors invest their money in a common fund, receiving therefor shares of stock, the fund constituting the capital upon which business is done. A sufficient premium is charged to protect the company against losses, to pay running expenses and yield a fair rate of interest upon the capital invested. In addition to the original capital, however, the premiums soon amount to a large sum, which is constantly increasing, and which can also be invested at a profit. All states have stringent laws for the protection of the insured, and companies must conform to the requirements of these laws, whose enforcement is usually in charge of a board of insurance commissioners.

FIRE INSURANCE. Fire insurance assumes risk against loss by fire. These risks include not only direct loss, but also indirect loss, such as damage done by water used in extinguishing the fire; loss caused by moving furniture from a building to save the same from fire; and loss incurred from destruction of the building by the authorities to prevent the spreading of the fire. Most policies contain a lightning clause protecting the insured against loss by fire caused by lightning. The policies also contain certain specifications with which the insured must comply in order to secure the protection desired. In case of partial loss, the company reserves the right to repair damages or replace property destroyed instead of paying the damage claimed by the insured, provided the parties to the contract cannot come to an agreement on a cash basis. The rate of premium depends upon the degree of risk. A higher rate is charged on frame buildings and contents than on brick buildings and contents. A higher rate is usually charged in towns and cities than on farm buildings.

TORNADO AND HAIL INSURANCE. This insures against loss from wind and hail and applies to growing crops as well as buildings.

LIFE INSURANCE. As now conducted, life insurance has two purposes, protection of one's family or some other beneficiary after death and the furnishing of a means of safe investment, where the money will yield a fair rate of interest. There are many forms of policy, but all fall under three classes: the straight life policy, payable at death; the endowment policy, payable at the end of a specied number of years; and the tontine policy, which is a modified form of the endowment policy. The premium is usually payable annually, and

is based on the age and occupation of the insured, the rate being determined by the means of mortuary tables, which show the average number of years that a person of a given age will live. The premium must be sufficient to enable the payments and interest to amount to the face of the policy at the end of this number of years. The rate for endowment policies is higher than for life policies. Usually, if the premium lapses the insured can surrender his policy and receive a part of what he has paid.

Accident insurance insures against injury or death by accident, and the policy may be for a long or a short period.

Insur'gent. See POLITICAL PARTIES IN THE UNITED STATES.

In'terest, the price paid for the use of money. The practice of paying interest in return for the use of capital was common among the Hebrews, the Greeks and the Romans. Payment of money for the use of money is justifiable because of the fact that capital can be invested in productive goods. Because of the disadvantages of waiting for these returns, interest, at a stipulated rate for a definite period of time, is agreed upon. Simple interest is interest allowed on the original capital. Compound interest is interest allowed on the principal plus the interest that accumulates from time to time, the investor thus receiving interest upon interest. A legal rate of interest is fixed in all states of the Union. This rate, although dependent upon the supply and demand of capital, has remained comparatively fixed in all the states within recent years. See CAPITAL.

Interest, the feeling, pleasurable or painful, aroused by an object which has gained our attention. As commonly used, the word refers only to those things which affect us happily, and the fact that we connect the term with sources of enjoyment shows the importance attached to voluntary attention in school methods. The things which enable us to avoid pain, overcome obstacles or prolong our happiness are the things which naturally interest us. Our homes, our business, our relaxations, are all associated with agreeable thoughts. The importance of interest in education is almost too well known to need discussion. We learn unconsciously those things which attract us, and especially when, as children, we are keenly alive to all impressions.

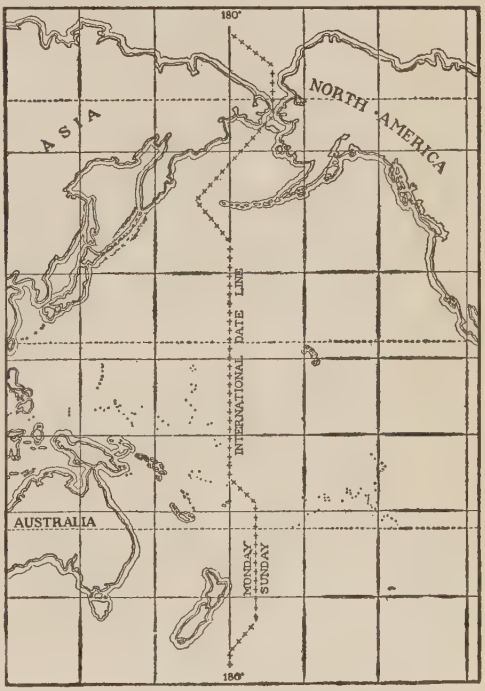
Appeal to the child's interests is revolutionizing school methods. The background of impressions differs so much in different minds that the things that interest one are tiresome to another, and parents and teachers often find cause to wonder at the things that prove interesting to different children. A dull child or a mischievous child is not one who is not interested, but rather is one whose interests are different from those of the majority. These need special guidance in forming their impressions rather than too frequent corrections. The problem of instructing is to find the point of interest as a beginning and work from that. Study and work cease to be tasks at the point where they become interesting.

Interior, Department of the, one of the ten executive departments of the United States Government, organized in 1849. At its head is the secretary of the interior, who is also a member of the president's cabinet. With him are associated two assistant secretaries. The scope of this department is wide and diversified. It has supervision of Indian affairs, of public lands, of mines, of pensions, of patents, of education, of national parks and reservations, and a vast amount of miscellaneous business. Nearly all of the bureaus into which the department is divided are presided over by commissioners appointed by the president, by and with the advice of the Senate.

Intern'al Revenue, revenue derived by the Federal Government from taxation other than that which the tariff imposes. It has usually been derived from taxes on articles designated as luxuries, and especially on those the use of which is likely to become a vice, as liquors and tobacco. The first of such

excise taxes was levied in 1790 and resulted in some temporary embarrassment in 1794 (See WHISKEY INSURRECTION). Excise taxes were abolished in 1801; reenacted during the War of 1812, but repealed in 1817; levied upon many articles during the Civil War, but afterward gradually reduced; increased, and levied upon numerous articles during the war with Spain. Certain of these were removed by 1902; but the taxes upon liquors and tobacco, and a few other articles, have been continued in force. Under the corporation excise-tax law of 1909, a corporation tax, payable to the collector of internal revenue, yielded approximately $21,000,000 in 1910. The total of internal revenues collected between 1789 and 1911 amounted to some $9,000,000,000. During the World War many special taxes were imposed on liquors, luxuries, incomes, excess profits, etc. The total internal revenue receipts for 1918 were $3,694,703,334.05. See CORPORATION; CORPORATIONS, BUREAU OF; TARIFF.

International Date Line, an imaginary and arbitrary line in the Pacific Ocean extending north and south, at which navigators change their date. The position of the meridian of a place with relation to the sun determines the time of that place. The moment the sun reaches the meridian of a place it is noon at that place. As the earth rotates, all the meridians pass in succession beneath the sun, and noon may be said to travel around the earth from east to west, making the circuit in 24 hours. Now, a watch carried westward around the globe is 24 hours behind on reaching the starting point. If carried in the opposite direction it gains 24 hours. Two travelers, therefore, starting from the same point, the one journeying east, the other west, are a day apart as to time, if they meet halfway. To prevent the confusion which would arise in international intercourse from the unbroken reckoning of days, it is necessary to have somewhere on the earth's surface a line at which the date, let us say, the first of January, begins. The meridian chosen to separate the dates is that of 180°. The chief reasons for this choice are, that the 180th meridian is 12 hours from Greenwich, or halfway round the globe, and that, being midway in the Pacific and far from civilization, no confusion results from its adoption. The international date line is not coincident with the 180th meridian, but shifts to the east near the 60th parallel, separating North America from Asia,



INTERNATIONAL DATE LINE

and deviates from the straight course at two other points to avoid separating groups of islands belonging to the same nation. This line, although in general use, has never been agreed to by international joint commission nor adopted by international treaty.

International Law, the body of rules which modern civilized nations regard as binding in their mutual intercourse. It is also called the law of nations, and rests upon those principles of right action, of justice and of consideration which have general acceptance in the

moral judgments of men everywhere. Therefore in the strict sense of the term, international law is not law at all, but a collection of usages, and differs in three important respects from ordinary constitutional law. First, it is not made by enactment of any legislative body. Second, in not being made by enactment it cannot be interpreted by any authorized body. Third, its provisions cannot be enforced by any superior power, because the great powers agreeing to the principles of international law stand on equal footing one toward another.

There are several principal sources of international law. These are the law of nature; opinions of recognized experts on international customs; treaties and agreements; decisions in arbitrations; decisions by courts of independent countries involving rights of citizens; opinions of important law offices of any government; and manuals of instructions issued by governments to their various officers abroad.

Interstate Commerce Commission, a Federal commission created by Congress in 1887, for the purpose of enforcing the Interstate Commerce Act passed that year. The act has for its purpose the prevention of discrimination in rates by common carriers, either railways or ships, on merchandise carried from one state into another. When first created, the Commission consisted of five members. It was given authority to hear complaints, to investigate alleged violations of the law and to compel common carriers to make reports. Later, the number of members was increased to eight, and the powers of the Commission were extended, giving it authority to set aside unreasonable rates and establish reasonable rates in their stead. The Commission has been successful in securing uniform rates from railways and steamship lines, and in preventing unjust discrimination against small shippers. The salary of the members is $10,000 a year. See CORPORATIONS, BUREAU OF; COMMON CARRIER.

Intestacy, *In tes' ta sy.* See WILL.

Intes'tines, the coils of membranous tubes constituting a part of the alimentary canal. The small intestine connects with the stomach at the pyloric orifice. It is about 23 ft. long, and its parts are the duodenum, jejunum and ileum. The large intestine encircles the smaller. Its parts are the colon, cæcum and rectum. The walls of the intestines are made up of four coats of membrane—serous, muscular, submucous and mucous. The mucous lining is laid in numerous cross ridges or folds, which provide a large surface for secretion and absorption and retard the passage of food that these processes may be complete. In the small intestine the mucus is covered with minute projections, called villi. Each villus contains an artery, a vein and a lacteal. See LACTEALS; DIGESTION.

Intox"ica'tion, the state produced by the excessive use of such stimulants as alcoholic beverages, opium, chloral or belladonna. In slight intoxication the stimulation of the brain and nervous system causes a feeling of buoyancy and heightened vitality, which soon wears off, leaving pain in the head and general lowering of vitality. In a state of complete intoxication a person may become incoherent in speech, lose his sense of equilibrium and finally become delirious and pass into deep sleep. During a period of intoxication he may perform vicious or violent deeds, of which he will have no recollection after he has been restored to normal condition. Numerous diseases are either aggravated or brought on by repeated intoxication, delirium tremens being the most common. See BRIGHT'S DISEASE; DELIRIUM TREMENS.

I'o, in Greek myths daughter of Inachus. She was loved by Jupiter, who, to protect her from the suspicions of jealous Juno, changed her into a beautiful white cow. Forced to present her as a gift to his wife, who set hundred-eyed Argus to watch her, Jupiter sent Mercury to rescue Io, and this he did by killing her guard. Still revengeful, Juno tormented her husband's mistress

with a gadfly, which drove her through far lands. Jupiter finally interceded for her. Thus, on reaching the banks of the Nile, Io was allowed to resume her original form.

I'odine, an element whose compounds are found in sea water and in many mineral springs. Seaweeds absorb it from the water, and these, when cast upon the beach, are gathered and burned. It was by accident in 1811 that iodine was discovered in this ash, called kelp, and it is now produced from it in large quantities. At ordinary temperatures iodine is a gray-black solid having a metallic luster and a penetrating odor. Its vapor has the true violet shade. Iodine is used in the laboratory to detect the presence of starch. In medicine, tincture of iodine is used in glandular diseases, and salts of iodine are used in photography and in the preparation of dyes.

Iodoform, *I o' do form,* a chemical compound made up of carbon, hydrogen and iodine and extensively used as an antiseptic. It is yellow in color, crystalline in form, has a sweet, but disagreeable taste and a sweetish, clean odor. It is soluble in ether and alcohol and is used in this form or in ointments prepared for ulcerous sores. Its penetrating odor is especially noticeable in hospitals, because of its prevalent use as an antiseptic.

Io'la, Kan., a city and the county seat of Allen Co., 108 m. s.w. of Kansas City, on the Neosho River and on the Missouri Pacific, the Missouri, Kansas & Texas, the Atchison, Topeka & Santa Fe and other railroads. The city is in a populous agricultural section and is rich in natural gas and deposits of building stone. The cheapness of the fuel gas discovered in 1893 has given an impetus to manufacturing, and there are in operation large zinc smelters, zinc rolling mills, brickyards, machine shops, cement works, a foundry, a sulphuric-acid plant and other industrial establishments. A large wholesale trade in flour, confections and other groceries is carried on. Settled in 1857, Iola was chartered as a city in 1898. Population in 1920, 8,513.

Ionian, *I o' ni an,* **Islands,** a small group of islands off the west coast of Greece in the Ionian Sea. Their combined area is 887 sq. m. The inhabitants are mostly of Greek descent, and the islands are under control of the Grecian Government. Though the surface is mountainous, agriculture, especially fruit growing, is an important industry. The exports include oil, soap, wine, textile fabrics and novelties. Population, 239,000.

Ionians, one of the leading tribes of Greece, said to have sprung from Ion, a descendant of Hellen, the legendary ancestor of all the Greeks. The Ionians of the Peloponnesus were driven out about 1000 B. C. by the Dorians. They settled in the islands of the Ægean or joined their kinfolk in Attica. About 600 B. C. Athens was the leading city of the Ionians.

Ionian Sea, the name of that part of the Mediterranean Sea which lies between the southern part of Italy and Greece. The Strait of Otranto connects it with the Adriatic Sea. Among its inlets on the coast of Greece is the Gulf of Corinth.

I'owa, THE HAWKEYE STATE, one of the West North Central States, is bounded on the n. by Minnesota, on the e. by Wisconsin and Illinois, from which it is separated by the Mississippi River, on the s. by Missouri and on the w. by Nebraska and South Dakota. The Missouri and Big Sioux rivers form the western boundary.

SIZE. The average length from east to west is about 300 m. The breadth from north to south is about 200 m. and the area is 56,147 sq. m., of which 561 sq. m. are water. Iowa is almost the exact size of Illinois or Wisconsin, a little smaller than Michigan, a little more than one-half the size of Nevada and the 24th state in area.

POPULATION. In 1920 the population was 2,404,021. There are 43.2 inhabitants to the square mile and the state's rank in population is 16.

SURFACE. Most of the surface is rolling prairie with a slight slope which in the eastern two-thirds of the state is to the southeast, and in the western part to the southwest. The highest elevations are in the northwest and the highest point, having an altitude of 1675 ft., is near Allendorf in Osceola County. The lowest point is in the southeast corner at Keokuk. The southern part of the state is more hilly than the northern, the crests and swells being smooth and used for grazing purposes. When hills occur in the northern part they are usually broken and irregular, and are often rocky. In the northeast there are high bluffs along the streams which sometimes rise 300 or 400 ft., and occasional hills extend a few miles back from the rivers. The numerous streams here flow between high, if not vertical, cliffs or through deep ravines. In the western part of the state is a series of bluffs rising from 100 ft. to 200 ft. above the flood plain of the Missouri. A low water parting extends from Spirit Lake on the northern boundary almost directly south to within 60 m. of the southern boundary, and separates the state into two drainage basins, that on the east containing the rivers flowing into the Mississippi and that on the west those flowing into the Missouri. The east basin occupies about two-thirds of the state.

RIVERS AND LAKES. The Des Moines crosses the state from north to south and is by far the most important stream. The other important streams flowing into the Mississippi are the Iowa, with its tributary the Cedar, the Wapsipinicon and the Skunk. The streams flowing into the Missouri are short and small, the most important being the Floyd's, the Little Sioux, the Maple and the Soldier.

The northwestern part of the state contains a number of small lakes noted for their beauty. They are all popular summer resorts. The largest are Spirit Lake and the two Okoboji Lakes in Dickinson County, and Clear Lake in Cerro Gordo County.

CLIMATE. Owing to the winds from the north the winters here are severe, the thermometer sometimes reaching 40° below zero, but the atmosphere is dry and the days are bright and sunny. Extremes of cold are usually of short duration, and owing to local conditions a low temperature here is not felt so much as zero weather in a humid atmosphere. The summers are warm and pleasant. Throughout the state the climate is remarkable for its healthfulness. The annual rainfall is 31½ inches, the greater part occurring during April, May, June and July.

MINERALS AND MINING. The southern part of the state contains deposits of bituminous coal, the fields having an area of about 20,000 sq. m., and coal mining is Iowa's most important mineral industry. The annual output is about 6,500,000 tons. There are valuable quarries of limestone at Marshalltown, Anamosa and other points. Large deposits of gypsum are found near Fort Dodge, and clay suitable for brick and pottery is found in many localities. Lead and zinc occur near Dubuque.

AGRICULTURE. Iowa is one of the foremost agricultural states and over 86 per cent of the land is under tillage. The farms are larger than in the states farther east and nearly all of them are tilled by their owners. Iowa leads all the states in the value of her agricultural machinery and implements. The most scientific methods of tillage and management are generally employed. The agricultural college at Ames has been very influential in advancing this industry.

Soil. Three varieties of soil are found: the alluvial soil of the river bottoms; the friable black loam of the prairies, covering most of the state; and the loess soil on the Missouri slope and along the streams in the eastern and central parts. Throughout the state the soil is fertile and easily tilled.

Products. Corn is the leading crop and in this production Iowa is second only to Illinois. Nearly one-fourth of the area of the state is planted to corn and the crop averages 300,000,000 bushels. The other field crops in the order

of value are oats, barley, wheat, rye, buckwheat, flaxseed, hay and potatoes. Large quantities of vegetables and apples are raised. Nearly one-third of the income of the farms is from live stock, and Iowa is one of the foremost states in raising horses, cattle and hogs. Excellent breeds of animals are maintained and horses and cattle sell for more than the average price. Fattening cattle and hogs for market is the most practical means of disposing of a large part of the corn crop.

Dairying is very important. Iowa is one of the leading states in the number of milch cows and in the production of butter and cheese. The annual income from the dairy products is about $19,000,000. Poultry raising is also important and yields an income of about $19,000,000.

Manufactures. Owing to the extent and importance of the agricultural interests, manufacturing in Iowa has not reached the proportions that it has in some other states of equal population. Among the leading industries are canning corn, and the manufacture of agricultural implements, of flour and grist-mill products and of glucose and corn sirup. Stucco and terra cotta are made at Fort Dodge and pearl buttons at Muscatine. These buttons are made from the shell of the mussel found in the rivers, and the industry is peculiar to this locality. There are large oatmeal mills at Cedar Rapids, Fort Dodge and Muscatine. Bricks, boots and shoes, machinery and interior finishings are also manufactured.

Transportation and Commerce. The Mississippi and Missouri are both navigable, but owing to the numerous trunk lines of railway practically all transportation is by rail. Railway lines extend across the state from east to west and from north to south, and in addition to the main trunk lines, cross lines extend in all directions, and all parts of the state have ample transportation facilities. The most important systems are the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Chicago, St. Paul, Minneapolis & Omaha, the Chicago, Rock Island & Pacific, the Illinois Central, the Chicago, Burlington & Quincy and the Minneapolis & St. Louis. There are electric lines in all of the large cities. Some of these join near-by towns. Des Moines, Council Bluffs, Marshalltown, Fort Dodge, Sioux City and Davenport are the most important railway centers.

Iowa has an extensive commerce consisting of a thriving local traffic and trade with the surrounding states. Live stock, dairy products, farm produce and manufactures are shipped to Chicago and other Eastern markets and such manufactured products and foods as cannot be produced within the state are imported. There are no great commercial centers, but the trade is equally distributed over the state.

Government. The present constitution was adopted in 1857. Every ten years the people must vote upon the question, "Shall there be a convention to revise the constitution, and amend the same? The executive department consists of a governor, lieutenant-governor, secretary of state, attorney-general, treasurer, auditor and superintendent of public instruction. The governor, auditor, secretary of state and treasurer comprise an executive council which has extensive administrative powers. Most of the various commissioners and minor officers are elected by the Legislature or appointed by the governor. The Legislature consists of the Senate of not more than 50 members and the House of Representatives of 108 members. Senators are elected for four years, one-half retiring every two years, and representatives for two years. Sessions of the Legislature are biennial and are unlimited.

The judicial department comprises a Supreme Court of 7 judges; District Courts of 64 judges elected for four years, with from one to five judges in each district into which the state is divided; and inferior courts. Cities and townships have municipal and justice courts. The judges of the District Courts

hold court in each county in their respective districts at least once a year.

EDUCATION. The state maintains an excellent system of public schools and the percentage of illiteracy is very low. The superintendent of public instruction is at the head of the educational system. There is a state board of examiners which issues certificates to teachers upon examination or upon graduation from accredited schools and colleges. The schools in each county are under the direction of the county superintendent. Excellent graded schools and high schools are maintained in all the cities and large towns. The high schools are accredited by the state university and other colleges. A uniform course of study is followed in the rural schools and a high standard of excellence is maintained. There is a state teachers' college at Cedar Falls and the state university is at Iowa City. The state agricultural college is at Ames.

Higher educational institutions not under control of the state are Iowa College at Grinnell; Cornell College at Mt. Vernon; Iowa Wesleyan College at Mt. Pleasant; the Central University of Iowa at Pella; Penn College at Oskaloosa; Norwegian Lutheran College at Decorah; Tabor College at Tabor; Des Moines College, Drake University and Highland Park College at Des Moines; Parson's College at Fairfield; Upper Iowa University at Fayette; Coe College at Cedar Rapids; Lenox College at Hopkinton; Buena Vista College at Storm Lake; Ellsworth College at Iowa Falls; Simpson College at Indianola; and Morningside College at Sioux City.

STATE INSTITUTIONS. The hospitals for the insane are at Mt. Pleasant, Independence, Cherokee and Clarinda. The school for the blind is at Vinton, that for the deaf at Council Bluffs and the home for the feeble-minded children is at Glenwood. The soldiers' home is at Marshalltown and the soldiers' orphans' home is at Davenport. State penitentiaries are at Fort Madison and Anamosa. An industrial school for boys is at Eldora; one for girls at Mitchellville.

CITIES. The chief cities are Des Moines, the capital; Dubuque, Davenport, Sioux City, Council Bluffs, Mason City, Cedar Rapids, Burlington, Ottumwa, Iowa City, Cedar Falls, Waterloo, Fort Dodge, Clinton and Keokuk.

HISTORY. Iowa, an Algonquin word meaning across, was applied to their enemies beyond the Mississippi by the Illinois Indians. The territory was originally occupied by the Iowas, Pottawattomies, Sacs, Foxes, Sioux and Winnebagoes. Though visited by Marquette and Joliet in 1673, a settlement was not made until 1788, when a French-Canadian trader, Julien Dubuque, erected a fort near the site of the city now bearing his name. Ceded to the United States by the Louisiana Purchase, 1803, Iowa became a part, in turn, of the territories Louisiana, Missouri, Michigan and Wisconsin. After Fort Madison, Dubuque and Iowa City were established, it became a separate territory, 1838, and was admitted as a free state in 1846.

GOVERNORS. Ansel Briggs, 1846-1850; Stephen Hempstead, 1850-1854; James Wilson Grimes, 1854-1858; Ralph P. Lowe, 1858-1860; Samuel Jordan Kirkwood, 1860-1864; William Milo Stone, 1864-1868; Samuel Merrill, 1868-1872; Cyrus Clay Carpenter, 1872-1876; Samuel Jordan Kirkwood, 1876-1877; Joshua Giddings Newbold, 1877-1878; John Henry Gear, 1878-1882; Buren Robinson Sherman, 1882-1886; William Larrabee, 1886-1890; Horace Boies, 1890-1894; Frank Darr Jackson, 1894-1896; Francis Marion Drake, 1896-1898; Leslie Mortier Shaw, 1898-1902; Albert Baird Cummins, 1902-1909; B. F. Carroll, 1909-1913; George W. Clarke, 1913-1917; W. L. Harding, 1917-1921; N. E. Kendall, 1921—.

Iowa City, Iowa, a city and the county seat of Johnson Co., 54 m. n.w. of Davenport and about 120 m. e. of Des Moines, on the Iowa River and on the Chicago, Rock Island & Pacific and the Iowa City & Cedar Rapids Interurban electric railway, of which it is the terminus. Iowa City is the trade

center for Johnson, Iowa and Cedar counties and has varied manufacturing interests. It operates flour mills, iron-works, woolen-goods factories, brick and tile works, foundries, machine shops, meat-packing plants, and manufactories of farming tools, brooms, soap, perfume and jewelry. Iowa City is the seat of the Iowa State University. Here also are the Iowa City Academy, the State Historical Society Library and Mercy Hospital. Prominent buildings of the town are a post-office building, a Carnegie library, an opera house, a city hall and county courthouse. Founded in 1839 and incorporated in 1853, Iowa City was, until 1857, the seat of the state and territorial governments. Population in 1920, U. S. census, 11,267.

Iowa River, a river of Iowa rising in Hancock County and flowing southeast into the Mississippi 20 m. below Muscatine. It has a length of about 350 m. and is navigable to Iowa City. Marshalltown, Belle Plaine and Iowa Falls are other important towns upon its banks.

Iowa State College of Agriculture and Mechanic Arts, at Ames (1858). This is a coeducational state institution, established by act of Legislature in 1858 and formally opened in 1869. It ranks among the foremost technical schools in the United States and is organized in departments of agriculture, engineering, veterinary medicine and science. In connection with the institution are a well-stocked farm, providing practical work in all lines of agriculture, and the Iowa Experiment Station. An excellent course in domestic science is included in the courses for women. The college has a plant of over 1342 acres, 185 acres of which form the campus. The value of the various buildings, stock, machinery and other equipment amounts to over half a million dollars, while the total college property is valued at $3,973,777. Tuition is free to residents of Iowa. The faculty numbers about 200 and the students, over 3500. There are over 55,000 volumes in the library. The college is developing rapidly.

Iowa State University, at Iowa City (1855). This institution occupies the old state capitol with some 40 other buildings, and a beautiful site of 100 acres on the bank of the Iowa River. Its affairs, with those of the state teachers' college and the state college of agriculture and mechanic arts, are directed by the Iowa State Board of Education. The university maintains a graduate college, a school of political and social sciences, and colleges of liberal arts, law, medicine, dentistry, pharmacy and applied science. The library contains more than 250,000 volumes. It enrolls more than 4200 students.

Ipecac, *Ip' e kak,* a drug derived from the dried roots of the ipecacuanha, a South American herb of the Madder Family. The plant is a jointed-stemmed herb with oval leaves and clusters of tubular flowers. The drug derived from the root is bitter and has a sickening odor. Medically, it is prescribed as an emetic and as an expectorant.

Iphigenia, *If" i je ni' a,* mythical daughter of Agamemnon, who, though reluctant, prepared to offer her as a propitiatory sacrifice to atone for having killed a sacred stag of Diana, who had been so outraged that she prevented his ships from sailing for Troy. At the final moment the goddess herself rescued the maiden, who had been decoyed under pretense of a marriage with Achilles. Conveying her to Tauris, Diana made her priestess of her temple.

Ire'land, E'rin or **Hiber'nia,** a name applied to the second largest island of the British Isles; it lies west of Great Britain, from which it is separated by the North Channel, the Irish Sea and St. George's Channel. West, north and south of Ireland are the waters of the Atlantic. The coast of Ireland on the east is fairly smooth, but on the west it is deeply indented with ragged bays and sharply carved by the estuaries of great rivers; thus there are many excellent harbors open to seagoing vessels. The area, including the numerous near-by islands, is 32,605 sq. m., practically the same as that of Maine.

SURFACE, RIVERS AND LAKES. The mountainous regions of Ireland lie mostly near the coast to the north and south. They consist of detached groups of granite or limestone ridges that partially enclose the central plain, with its low, rolling hills and characteristic bog land. The rainfall, which is abundant and evenly distributed, supplies the large rivers that cross the country and fills the beautiful lakes, for which Ireland is famous. The principal rivers are the Shannon, Lee, Barrow, Blackwater, Suir, Nore, Bann, Foyle, Boyne, Slaney, Liffey, Lagan and Erne. The lakes, there termed loughs, are picturesque and lie among the emerald slopes in extended chains. The largest and best known are the oft-sung Lakes of Killarney, and the Neagh, Erne, Allen, Mask and Derg.

Because of the deep indentations of the coast, no part of Ireland is more than 60 m. from the sea, and the westerly winds render the climate mild and moist; thus the slopes are verdure-covered and have given to Ireland the familiar name of the Emerald Isle.

INDUSTRIES. Ireland is not an agricultural country. The farms are small, and much of the land is possessed by English proprietors. Potatoes, corn, barley, wheat and many vegetables are raised.

The fisheries, though not as important as those of Great Britain, are of considerable value, and herring, cod, hake, salmon and eels are abundantly taken. Coal is practically the only mineral mined. In manufacturing, the linen industry is far in the lead, and Irish linen is everywhere in demand. Belfast, in the Province of Ulster, is the center of this enterprise, and fine embroidering upon muslin is one of the great departments of industry. Belfast is also noted for its shipbuilding and its paper manufactories. The chief exports of Ireland, almost all of which go to Great Britain, are linen, live stock, whiskey, eggs, bacon and salt beef.

COMMUNICATION AND TRANSPORTATION. Ireland has modern railways connecting all the principal cities. Its canal system forms an important means of traffic and has been extensively built up because of the long chains of lakes that made this form of transportation easily available. Telephone and telegraph lines are common and are in familiar use.

EDUCATION AND RELIGION. The system of education is theoretically the same as that of Great Britain (See EDUCATION, NATIONAL SYSTEMS OF, subhead *Great Britain*). The higher institutions of learning are excellent; the University of Dublin, founded in 1591, is the most important of these. Others of note are the Royal University of Ireland, the University of Ireland and the Royal College of Science, all at Dublin, and the Queen's colleges of Belfast, Cork and Galway. Fully 70 per cent of the people of Ireland are Roman Catholics. The adherents of the Church of England and the Presbyterian Church constitute the remaining 30 per cent.

GOVERNMENT. Ireland has had no local Parliament since 1800. It sends to the House of Lords at London 28 peers, who are elected for life from the entire body of Irish peers, about 100 in number. To the House of Commons it sends 103 members, 85 of whom are elected by the counties, 16 by the boroughs and two by the universities. The government is administered by the lord lieutenant of Ireland, whose secretary is a member of the British cabinet. A Privy Council is chosen by the Crown. Ireland is divided into four provinces, which are together made up of 32 counties. Aside from these, Dublin and Belfast are independent cities. The highest authority for the county is a council elected by the people of the county for a term of three years. Since 1911 women have been eligible to election in the same manner and under the same qualifications as men. A movement for obtaining Home Rule for Ireland is making rapid progress. See HOME RULE.

The language of Ireland was formerly the old Irish branch of the Gaelic tongue, but now fully 99 per cent of the population speak English. The principal cities

are Dublin, Belfast, Cork, Queenstown, Waterford, Limerick and Galway. Population, 4,459,000.

History. The early history of Ireland is lost in fable and legend. The earliest inhabitants seem to have come from the Mediterranean, but various Celtic tribes later subjugated the country. The country was early converted to Christianity, chiefly through the mission of a young priest (about 430), afterwards known as St. Patrick (See Patrick, Saint).

The first Norse invasion occurred in 795. These adventurers established themselves at Dublin about 851, and their kingdom remained until the Norman conquest of the island. Brian Boruma (1002-1014) brought a large part of the island under his sway, and the bards, to whom he was generous, sang his praises. We are told that he improved the country by building bridges and roads and that he maintained impartial justice. During the rule of Henry II, Dermod MacMurrough, King of Leinster, was driven from his kingdom and sought refuge and help from England. He regained his territory with the help of Richard, Earl of Pembroke, surnamed Strongbow, who married Dermod's daughter, Eva, and ruled after Dermod's death. When Henry II visited Ireland in 1172 he was recognized as lord of the nobles and their ruler, Roderick O'Connor. Many Normans settled in the country, but they were absorbed among the rest of the people. Even in 1485 only Dublin and a few towns along the coast were under English rule.

Henry VII, who in 1541 was given the title of King of Ireland by the Irish Parliament, began the persecution of the Irish Catholics after his break with the Pope, and the persecutions were continued under Edward VI. Elizabeth placed Protestant clergy over the people, confiscated large tracts of land from the Irish nobles and gave them to English nobles. The whole island was brought under English rule, and all Catholics were debarred from public offices. In 1641 the Irish rose in rebellion but were put down promptly by Cromwell. The Irish espoused the cause of James II and were defeated by William III in the Battle of the Boyne in 1690. Although England made a treaty the next year granting freedom of worship to the Catholics, she did not keep the terms and 1,000,000 acres were taken from the Catholics and divided among the Protestants, while all Catholics were still excluded from office.

From 1778, the Catholics were allowed to own landed property, build schools and worship with greater freedom. Another rebellion was suppressed in 1798, and in 1800 the Irish Parliament voted to unite with the British Parliament.

There were fearful famines in 1845 and 1846, when thousands died at home and more thousands fled to America. An attempt to gain independence was made in 1848, and another, made by the Fenian Society in 1865, was furthered by Irishmen in the United States and other countries. Home Rule became a leading question. This favors a scheme similar to that used in governing Canada and Australia—an Irish Parliament with self-government in local affairs and under British sovereignty. In the elections of 1918 the Sinn Fein party won and soon after announced the Irish Republic.

A bill granting Ireland Home Rule was finally passed by the British House of Commons in 1920. Recently there has been much disturbance with heavy loss of life and property.

Ireland, John (1838-1918), a Roman Catholic prelate, born in County Kilkenny, Ireland. When a young lad, his parents settled in St. Paul, Minn., where he later became one of the foremost leaders of his Church, having been educated in France and ordained a priest there in 1861. In 1884 he was consecrated Bishop of St. Paul. In 1888 he became archbishop of the same place. Archbishop Ireland is an able orator and controvertist. He is an earnest temperance advocate, having organized the first total abstinence society in Minne-

sota. He has done much for Catholic colonization in the Northwest by buying tracts of land to be taken up by people of his faith. With Bishop Keane he drew up a report for the Pope on the subject of a Catholic University, with the subsequent establishment of which at Washington, D. C., he was a vital worker. For several years he has been president of the State Historical Society of Minnesota.

Irenæus, *I" re ne' us,* **Saint,** Bishop of Lyons, a Churchman who flourished in the latter part of the second century. He was a pupil of Polycarp. Irenæus strongly opposed the school of Gnostic philosophers, and endeavored to make peace between the Eastern and Western branches of the Church in the controversy concerning the day to be observed as Easter. He wrote *Against Heresies.* St. Irenæus Day is June 28.

Irid'ium, a white lustrous metal first separated in 1802. It has an unusually high melting point, 3600° F., and is not acted upon by any acids when pure. Combined with platinum it may be dissolved in aqua regia, a strong acid made up of nitric and muriatic acids. Iridium is the heaviest substance known, except osmium, which it closely resembles. It is used for making the points of gold pens.

I'ris, in Greek mythology goddess of the rainbow and attendant and messenger for Juno. She wore golden wings and a parti-colored robe; thus her pathway from heaven to earth became a rainbow.

Iris, a beautiful plant of the Iris Family whose natural home is in marshes or near water. It has long rushlike leaves and a hollow flower stalk bearing one erect blossom and possibly several long buds at a sharp angle. The flower has three outward-curving and three overarched divisions, which are purple, white, mauve or yellow marked with darker lines. These divisions are apt to become paler and more spreading as the flowers age. The blue flag of the marshes is a wild iris, but the most familiar species are those found in cultivation. The iris is sometimes called the flower-de-luce, said to be a corruption of "flower of Louis." It is the national flower of France, generally spoken of as the "lilies of France," and is also the emblem of the city of Florence, where the white-flowered iris is common. The fleur-de-lis is a conventionalized design taken from the iris. In poetry it typifies wisdom, faith and courage.

IRIS

Irish Moss, or **Carragheen,** *Kair' a geen",* the dried, branching stems of a dark purple seaweed, or alga, which grows in the water along the northern coasts of America and Europe and especially in the North Sea. The plant lives attached to some support but derives its nourishment from the water by means of flat, ribbonlike branches. When dried these are light yellow in color and are used in the preparation of jellies employed for laboratory purposes. The chief nutrients of Irish moss are carbohydrates.

Irish Plays, a group of plays representing the dramatic phase of the modern Irish literary movement. This dramatic activity has resulted in the establishment of the Abbey Theater in Dublin, and the presentation of a native Irish drama—"works by Irish writers on Irish subjects." Chief sponsors of the dramatic movement were Lady Gregory, William B. Yeats and John M. Synge (d. 1909). The Abbey Theater company presented a number of these plays in the United States, where they attracted considerable interest and favorable comment. Theodore Roosevelt has written

of them: "The Irish Plays are of such importance because they spring from the soil and deal with Irish things, the familiar home things which the writers really know." The following are representative of this group of plays: Lady Gregory, *Spreading the News, The Rising of the Moon, The Bogie Men* and *The Workhouse Ward;* Yeats, *The Countess Cathleen, Cathleen ni Hoolihan, The Land of Heart's Desire* and *The Pot of Broth;* Synge, *The Playboy of the Western World, Shadows of the Glen* and *Riders to the Sea;* T. C. Murray, *Maurice Harte;* William Boyle, *Family Failing.*

Irish Sea, the part of the Atlantic Ocean lying between Great Britain and Ireland, connecting with the ocean to the north by North Channel and to the south by St. George's Channel. It has a greatest width of 140 m. and its length is nearly the same. The Isle of Man lies in its north-central part, and Anglesey is in the southeast.

Irkutsk, *Ir kootsk',* a city of southern Siberia, situated on the Angara River and Trans-Siberian Railway, 3792 m. by rail from St. Petersburg. The streets of the city are well lighted and well paved. The public institutions and buildings now include a school of medicine, a military hospital, a museum, the governor's palace and the royal factories. Leather, woolens and linens are manufactured, and a large fair is held annually in December. The town was established in 1686, although it had been a center for collecting the fur tax from the Buriats in 1652. It is still an important commercial station and is the seat of several learned societies and an archbishopric of the Orthodox Greek Church. Population in 1900, 49,106.

Iron and Steel. Iron is one of the most common metals. Pure iron is of a silvery-gray color, takes a soft luster when polished and is about seven and three-fourths times heavier than water. It has a crystalline or fibrous texture, according to the method of manufacture, and possesses great strength. Iron is strongly magnetic and very ductile and malleable. It can be wrought into almost any form when subjected to suitable processes.

Compounds. Iron unites with other substances to form a great number of compounds. With oxygen, it forms a number of oxides, of which iron rust is the most common. Its compounds with chlorine are of value in medicine, and with sulphur it forms pyrite, which is the chief source of copperas, or green vitriol.

Ores. Pure iron is not found in natural formations, but the metal is widely distributed over the earth in combination with other substances forming iron ores. The most common ore is red hematite, from which by far the larger part of the iron of commerce is obtained. Other important ores are brown hematite, or limonite; magnetic iron, or magnetite; siderite, or spathic iron; and pyrite. Iron is also found in small quantities in some mineral waters and in sea water. The United States is the leading country in the production of iron ore, and the most extensive deposits are those in Minnesota and Michigan, bordering on Lake Superior. Large deposits are also found in the Adirondack Mountains, in Pennsylvania, Virginia, Ohio, Alabama, Georgia, Tennessee, Missouri and Colorado. In Canada there are mines of great value in the provinces of Quebec, Ontario and British Columbia. Newfoundland also contains valuable mines. Of European countries, Russia, the German Empire, Norway, Sweden, Belgium, France, Spain, Austria and England all have valuable mines, and, until recently, England was the leading country of the world in the production of iron. Iron is found in India, China, Japan, Australia, Africa and South America, but the mines in these regions have not been extensively worked.

Mining and Shipping Ore. When the ore occurs in the form of a ledge, it has to be broken up by blasting. The loosened ore is then loaded upon cars or boats, according to the transportation facilities upon which the mine depends, and shipped to the smelters. The

ore in the Lake Superior region is in the loose form of decomposed rock, and is loaded upon cars especially constructed for the purpose, by steam shovels. When loaded, these cars are run upon an elevated roadway at the ore docks. Beneath the roadway are immense ore bins, with bottoms sloping toward the dock. At the bottom of each bin is an iron spout or chute, which can be readily lowered to the hatchway on the ore steamer. The cars are unloaded by dumping or by opening a slide in the bottom of the car, so that an entire train can be unloaded in a very few minutes.

The ore boats are the largest steamers in the Great Lakes, some being about 600 ft. long and having a capacity of from 12,000 to 18,000 tons. One of these boats can be loaded by means of the ore chutes in from 40 to 50 minutes, and can be unloaded by equally ingenious machinery in from four to five hours. So perfect are the facilities for mining and shipping this ore that the entire expense does not exceed 85 cents per ton.

SMELTING. It requires about two tons of fuel to smelt one ton of ore; consequently in the United States the great smelting works are located in or near the coal fields, at Cleveland, Pittsburgh, Chicago and other cities in Ohio, Pennsylvania and Illinois. Practically all the ore is smelted in a blast furnace (See BLAST FURNACE). Ores containing any appreciable quantity of sulphur are roasted to drive off the sulphur, and those containing dirt are washed; other impurities are removed during smelting. Coke is the fuel most generally used. The ore is crushed to the fineness of gravel, then mixed with the proper proportions of coke and limestone, which have likewise been crushed to the same degree of fineness, and the mixture is loaded into the furnace at the top. When the right temperature is reached, the limestone unites with the silica in the ore, forming slag, and setting the iron free. As the iron melts, it runs down to the hearth of the furnace, where it is drawn off and cast into bars, forming pig iron. The slag, being lighter than the molten iron, floats on the surface, and is drawn off through an opening above the one through which the iron flows.

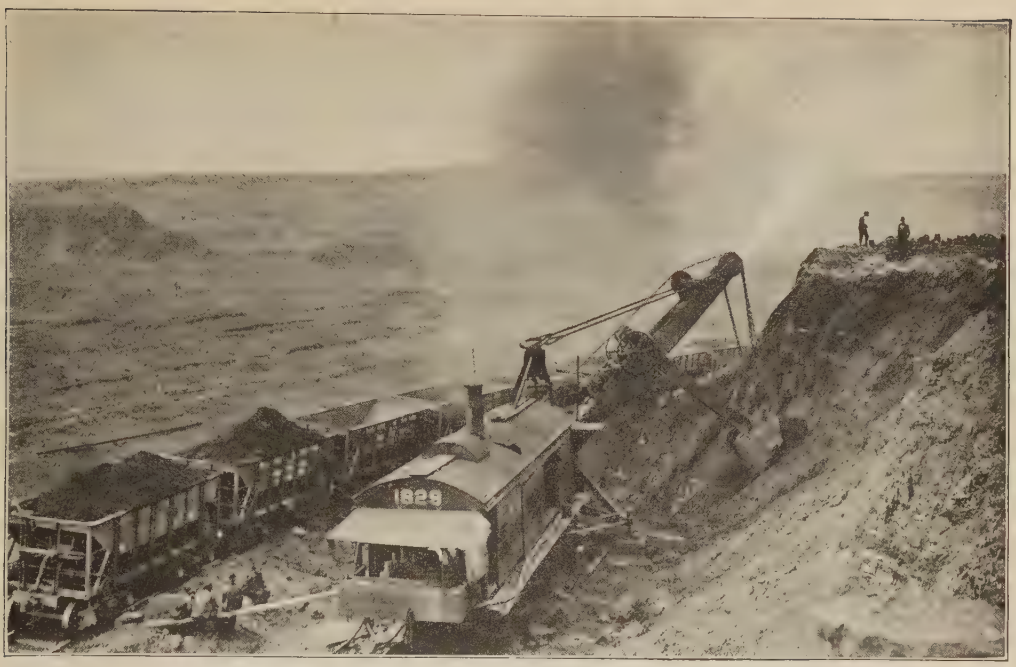
Pig iron is generally cast in a machine consisting of two endless chains carrying steel molds of the size and shape of the bars. As the molds are filled, the chains carry them along slowly so as to give the iron time to solidify, then passes them through a tank of water, which completes the cooling. Formerly pig iron was cast in molds in sand on the foundry floor. Long channels were made leading from the furnace to various parts of the floor, and short channels, each forming a bar, extended on each side of them. The long channels were called sows and the short ones pigs; hence the name pig iron.

VARIETIES OF IRON. Iron is found in use as pig iron, wrought iron and steel.

Pig Iron. The process of making pig iron is described above, and because of its containing more or less impurities, such as silicon, manganese and phosphorus, it is coarse in structure and brittle. Its crystalline formation becomes smaller as it is refined by remelting, and its strength is increased.

Wrought Iron. Iron in this form was known and manufactured by primitive methods long before the process of casting iron was discovered, but it is now usually made by remelting and refining cast iron in a furnace called a reverberatory furnace (See REVERBERATORY FURNACE), the operation being known as puddling. The furnace is prepared for charging by covering the bottom and sides with several inches of some oxidizing material, which is heated until it fuses. Slag is spread over the bottom of the furnace, and the pig iron, generally to the amount of 500 lb., is broken into smaller pieces and laid over it. Gas is the preferable fuel, but coal or coke may be used. When the iron begins to melt, the puddler stirs it with a long bar called a rabble, which is pushed through a small aperture or door made for the purpose. The operation requires

WHERE THE IRON COMES FROM



Let us visit first the iron mines near Duluth, where we find the crude iron ore being scooped up by machinery and deposited in open ore cars. As soon as these cars are filled they are hauled to the steamship docks. The ore in this form is of comparatively small value.

Here we see two great freighters at Duluth being loaded with the ore, which is poured down through long pipes or chutes into the hold of the boats. These vessels will presently swing out from the docks and begin their lake trip to the smelting works.

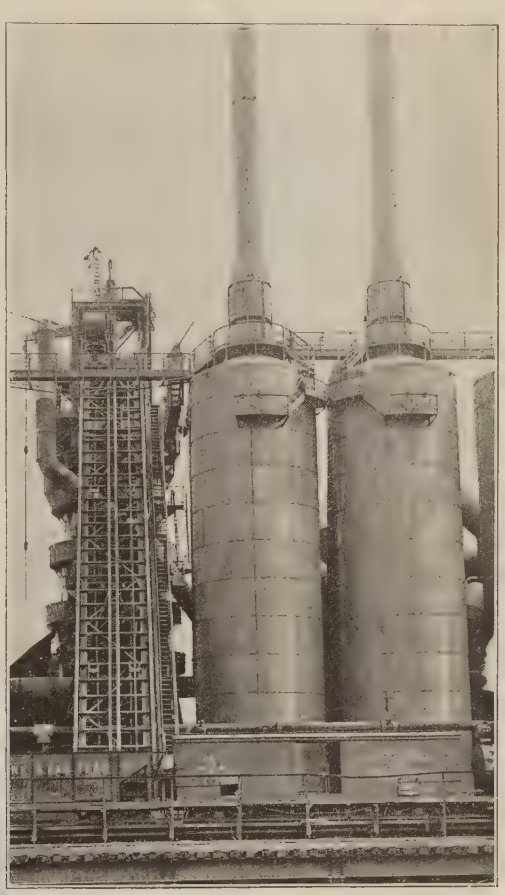
Photographs by courtesy of Illinois Steel Company.

One of the boats has arrived at South Chicago, and the unloading process begins. Again machinery is made to do the work of many human hands. These unloading machines reach deep down into the bottom of the vessels and—

Scoop up the ore. This view snows the hold of the boat with one of the giant "grabs" picking up a pile of ore. The ore is elevated through the hatchways seen in the picture above. It is then dumped once more into ore cars and hauled to the smelting furnace, where begins the process of refining.

CRUDE ORE TURNED INTO VALUABLE PRODUCTS

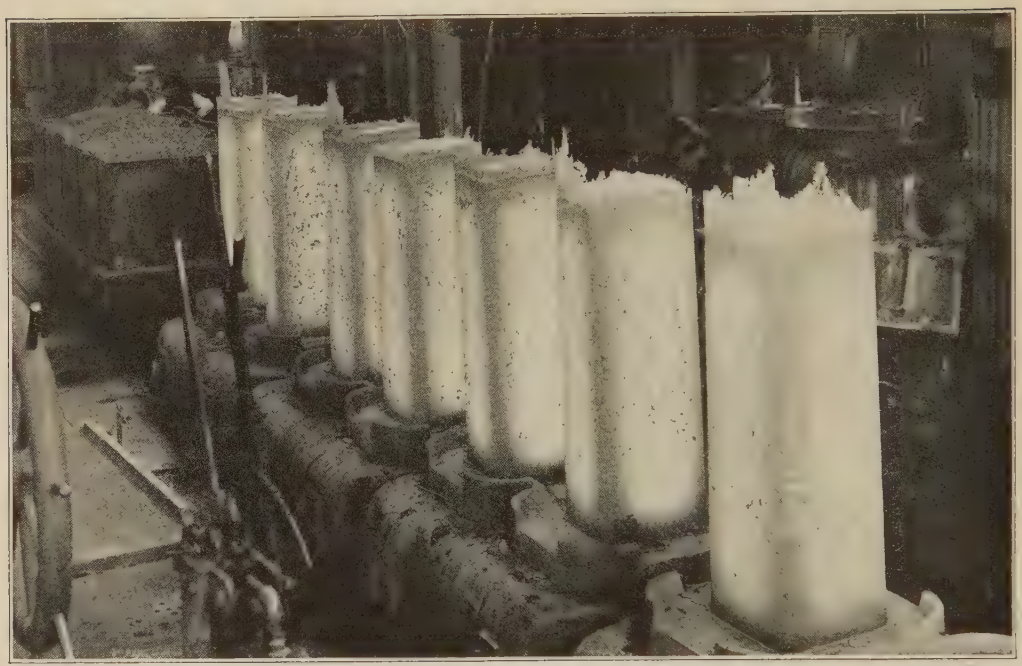
At the smelting works the ore is mixed with such proportions of crushed coke and limestone as are necessary to insure the extraction of all the iron. The limestone acts as a flux, uniting with the other minerals in the ore and setting the iron free. When prepared for smelting the ore is hoisted to the top of the furnace by a device known as the skip-hoist. See the car at the top of the skip-hoist to the left. The intense heat necessary for smelting the ore is secured by driving a blast of hot air through the ore and coke.



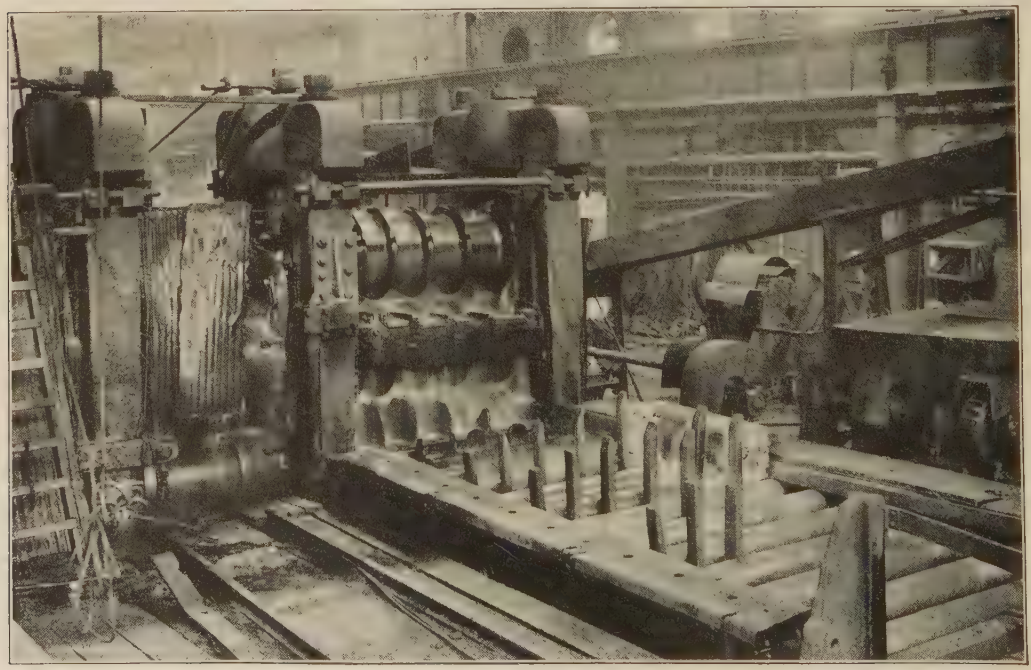
The now molten iron runs down to the bottom of the furnace, and is drawn off and poured into molds where it is allowed to cool. After it has become solid the molds are stripped off, leaving the white-hot ingots.

The slag, being lighter than the iron, floats on top and is drawn off through an opening above that through which the iron flows.

HOW STEEL INGOTS ARE ROLLED INTO RAILS

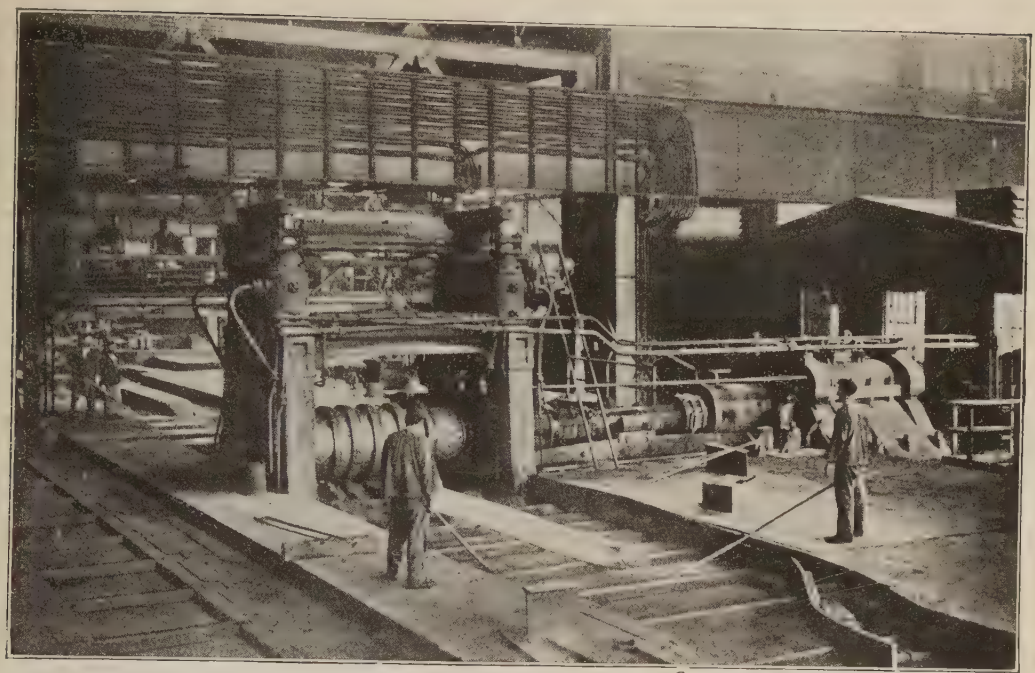


The ingots are taken to the "soaking pit," a furnace in which they are again heated until they become soft enough for rolling, when they are taken to the



Rolling mill, where the work of rolling the ingots into steel rails begins. Many people think that steel rails are cast, but such is not the case.

HOW THE RAILS ARE FINISHED



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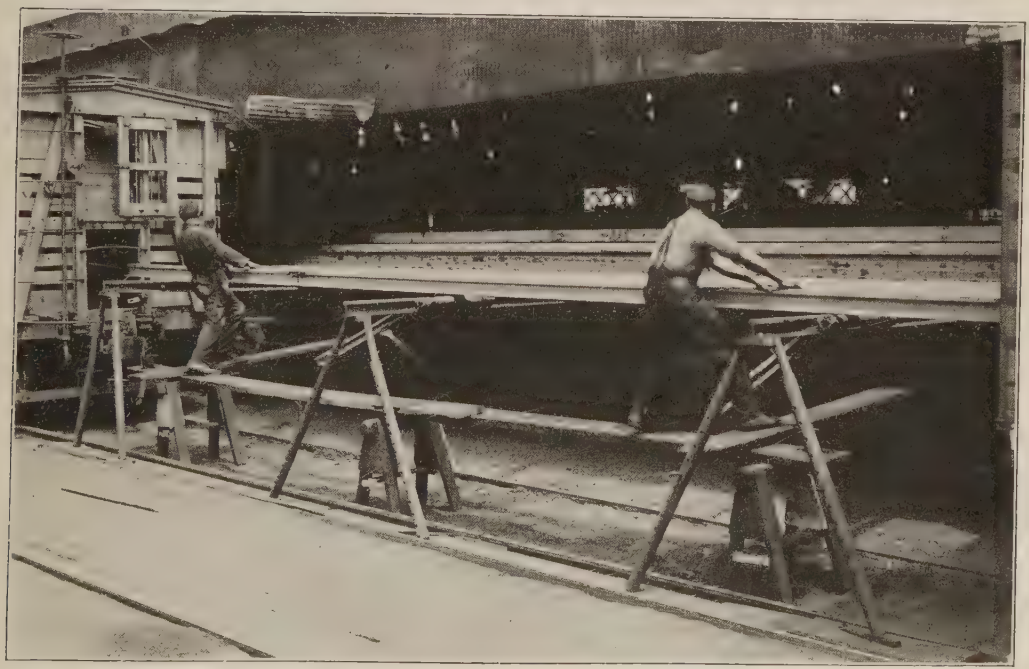
The steel is rolled in these great rolling machines until it finally comes out the finished rail, when it is taken to the--



Shipping department and shipped to the markets which may be in Africa or South America or China. Not all the steel, of course, is turned into rails. Some of it becomes boiler plate; some of it is turned into bridge material. Some of it becomes knife-blades or razors or watch springs, or serving any one of thousands of uses to which steel is assigned. The cheap, coarse, imperfect iron ore becomes by the process of refining, of very great value, and in this process there is a valuable lesson for human beings. The crude ore of humanity finds its value multiplied many times by the refinement of education.

IRON AND STEEL

severe muscular exertion, and the amount handled is limited to the physical power of the workman. The color of the molten iron shows the puddler when the impurities, particularly the silicon, have been expelled, and he then gathers on the end of the tool a ball, generally 80 to 100 lb. in weight, which afterwards is squeezed, hammered and rolled to expel the slag and cinder, as a sponge is squeezed to expel water, leaving a rough bar of iron called muck bar. Several balls may be laid on each other and all hammered into one mass, and these may be rolled while hot into a puddled bar. Merchant iron is made by bundling these muck bars into piles, which are rolled into a larger mass, or bloom, of proper sections, which after being heated to a welding temperature is rolled into the desired shapes. See ROLLING MILL.

The term *wrought iron* generally means the product of the puddling furnace, and it is soft, flexible, ductile and malleable. It is easily welded and fabricated into any desired form. Its texture is fibrous and not crystalline like that of pig iron; it possesses considerable tensile strength and can be annealed to many degrees of hardness (See ANNEALING). Wrought iron is extensively used for horseshoes and horseshoe nails, and for bars supplying country smiths who have not yet learned the methods of treating the mild steels. Welded steam, gas and water pipes are still made of wrought iron, because thoroughness of welding is here highly important. Wrought iron is adaptable to more uses than cast iron, but it is now largely displaced by steel, for the reason that by improved methods, steel can be made more cheaply.

HISTORY. Of all the metals, iron was the earliest known. In the Bible in *Genesis iv, 22,* Tubal-cain is mentioned as "instructor of every artificer of brass and iron." In the book of *Job,* iron is also referred to. No doubt the ancient Egyptians knew much about iron and steel. The vast deposits of iron ore in India were known from remote times, and it is reasonably certain to fix the date of 1406 B. C. as that of the discovery of iron at Mt. Ida. The Assyrians and Babylonians were skillful artificers in iron, and the Greeks may have learned the art of ironworking from them, as the Romans learned it from the Greeks. The Romans in their invasion of Britain found the natives working iron in rude forges, and other nations in Europe were workers of iron at an early date.

In the United States iron ore was discovered by the expedition sent out by Sir Walter Raleigh in 1585, and in 1608 a cargo of iron ore was shipped from Virginia to England, from which commercial iron was made. The first ironworks built in the United States were located near Lynn, Mass., between the years 1643 and 1645. During colonial times the iron industry was opposed by the home government and little was done, but when war was declared, being unable to get supplies of iron from Europe, the Americans began to make iron and fabricate many of the necessary articles. It was not until anthracite for smelting was employed by David Thomas at Catasauqua, Pa., in 1840 that the industry began to be of any commercial importance. The world's annual production of pig iron is about 66,000,0000 metric tons. Of this amount the United States produces about 39,000,000 metric tons. The other leading iron-producing countries in order of their importance are Germany, the United Kingdom, France, Russia and Austria-Hungary.

USES IN MEDICINE. Iron is used both as a food and as a medicine. When applied externally, it is not absorbed by the unbroken skin, but when put on sores, ulcers, and mucous surfaces, the salts of iron act as powerful astringents and cause coagulation of the blood, and for this reason they have been used to stop hemorrhages. A large proportion of our diet contains iron. The medical preparations of iron have an astringent taste, and they blacken the teeth and tongue. In the stomach, all salts of iron, whatever their nature, are converted into chlorides of iron.

IRON AND STEEL

STEEL

DESCRIPTION. Steel is one of the various forms of manufactured iron. Formerly the term was applied only to iron which had been carbonized, or into which a small quantity of carbon had been burned. The term *steel* now includes iron into which carbon has been burned and from which it has been removed by burning, and it is produced by a variety of processes, all of which, however, depend upon two principles, adding carbon to wrought iron (cementation) and removing carbon from pig iron (decarbonization).

Steel is grayish-white, has a granular texture and is remarkable for the varying degrees of hardness, elasticity and strength to which it can be developed by proper treatment. It possesses greater tensile strength than any other form of iron; it is easily welded and can be tempered to various degrees of hardness; it can be made so brittle that it is easily broken, and so elastic as to produce the hairspring of a watch.

VARIETIES. There are numerous varieties, depending upon the methods of manufacture, and alloys. All varieties contain sufficient carbon to make them suitable for making edge tools.

Blister Steel, or *Tool Steel.* This steel is made by a process called cementation, probably the oldest-known steel-making method, and consists in taking high-grade wrought-iron bars and putting them in fire-clay boxes with pulverized charcoal and heating them from four to eight days, according to the grade of the steel desired. This carbonizes the iron and produces blisters on the bars, from which the term *blister steel* is derived. Bars of blister steel when welded together form shear steel. The use of this steel is limited, because it contains seams or pits of slag, and to get rid of this the steel is melted in a crucible out of contact with the air. When free from slag it can be cast into ingots or rolled or hammered into any desired shape.

Crucible Steel. The above process is expensive, and the more common method of making crucible steel, especially in America, is to place powdered charcoal and crude bar iron in the crucible. The iron will absorb the carbon of the charcoal very rapidly when it is in a molten state. Frequently, wrought iron and pig iron are melted together. Crucible steel is produced in Sweden from iron ore of great purity and refined pig iron. Blister steel and crucible steel are used chiefly for high-class edge tools, springs, etc.

Bessemer Steel. Bessemer steel has taken its name from that of the inventor, Sir Henry Bessemer of England. In its manufacture the carbon is burned out of the iron, which is the reverse of the cementation process. The furnace used is the Bessemer converter (See BESSEMER CONVERTER), which is charged with pig iron, either directly from a blast furnace or from ladles, or from a large vessel called a mixer, into which iron from several blast furnaces may have been poured. When charged, the converter is tipped upon its side, and then tipped back to an upright position. The action automatically opens an air valve connected with the air blast, which at a pressure of from 15 to 25 lb. to the square inch is forced through the tuyères into molten metal. This oxidizes the carbon and burns out the silicon, producing a severe boiling of the metal. Manganese, phosphorus and sulphur are also eliminated. When sufficient silicon and carbon have been burned out, as shown by the color of the flame, the converter is again tipped upon its side and a small quantity of spiegeleisen, an alloy of highly carbonized iron and manganese, is added to the charge. After thoroughly mixing, the metal is poured out into ladles and run into ingots.

Open-Hearth Steel. This steel is made in a furnace of the flame type closely resembling a reverberatory furnace (See REVERBERATORY FURNACE), with the addition of much checker-brick construction forming a system for the heating of the air (See OPEN-HEARTH FURNACE). Stock consisting of pig iron, steel scrap and wrought iron is loaded

by piling in boxes on cars, which are carried on an inclined track to the charging door and placed directly in front of it. The boxes are picked up and pushed into the furnace, emptied and replaced on the car by an electric charging machine. All the doors and valves of the furnaces and the heating chamber, called regenerators, are operated by pneumatic cylinders, the cocks of which are manipulated by a workman on the charging floor. The melted steel in the furnace is tapped into ladles of 30 to 60 tons' capacity, which, being suspended from a traveling crane during casting, are at once taken to a pit full of empty molds, in which the ingots are cast.

Armor Plate. Armor plate is made by hardening the surface of one side of a steel plate, that of Harveyizing being the principal process used. The side treated is afterwards heated, and then suddenly chilled.

Alloys. Steel is alloyed with nickel, chromium, tungsten, manganese and vanadium in varying proportions for different purposes. The so-called high-speed tool steel is made principally of chromium and tungsten alloys, and tools made of them instead of losing their temper by being highly heated get considerably harder, and hence will cut six times as fast as those made of carbon steel. Manganese and vanadium are used in making steel for automobile frames in order that a tough metal may be produced.

Uses. The cheapening of production by new methods, particularly the Bessemer process, has made steel available for structural purposes, as well as for displacing iron in all forms. Plates made by the open-hearth process are so easily stamped into shape that many small articles formerly made of cast iron are now made of this steel. The world's production of steel is 50,000,000 tons, nearly one-half of which comes from the United States.

Iron Crown, a crown used by Lombard kings and later by German emperors. It is in six pieces, adorned with precious stones, enamel and roses of gold. According to tradition the name was given from an iron circle made from a nail used in the crucifixion. It was worn by Charlemagne, Charles V, Napoleon and others, and was placed in the Church of St. John the Baptist at Monza, Italy, in 1866.

Iron Duke, the name popularly given to the Duke of Wellington.

Iron Mountain, Mich., a city and the county seat of Dickinson Co., 57 m. n.w. of Escanaba and about 206 m. n. of Milwaukee, Wis., on the Chicago & Northwestern, the Chicago, Milwaukee & St. Paul and other railroads. The town is situated about 1160 ft. above sea level. It has extensive mining interests. Settled in 1879, Iron Mountain was incorporated in 1888. Population in 1920, U. S. census, 8,251.

I'ronton, Ohio, a city and county seat of Lawrence Co., 100 m. s.e. of Columbus and 134 m. s.e. of Cincinnati, on the Ohio River and on the Detroit, Toledo & Ironton, the Norfolk & Western and the Cincinnati, Hamilton & Dayton railroads. The Chesapeake & Ohio Railroad in Kentucky has also a ferry across the Ohio both for passengers and freight. It has an extensive river commerce and lumber trade. The chief industrial establishments include blast furnaces, rolling mills, nail and wire works, furniture factories, boiler works and manufactories of doors, mantels, fire brick and stoves. The clay in the vicinity is much used for pottery. The Kingsbury School and Briggs Public Library are located here. There is also a city hospital, Masonic Temple and Memorial Hall. Ironton was settled in 1832 and incorporated in 1849. Population in 1920, U. S. Census, 14,007.

Ironwood, or **Hop Hornbeam,** a handsome tree of the Birch Family, often used as a lawn tree. It is found throughout the United States and southern Canada east of the Rockies. The bark is rough, with long, loose, yellow-gray scales. The leaves, which are abundant, are oval, but sharp-pointed and finely saw-toothed. The winter buds are short, pointed and cylindrical, and ac-

company groups of solid, unopened catkins at the ends of the branches; in the late spring these catkins, which have opened with the leaves, produce leafy seeds, that together form light-colored cones. The ironwood much resembles the hornbeam and is a member of the same genus.

Ironwood, Mich., a city of Gogebic Co., about 12 m. s. of Lake Superior and 33 m. s.e. of Ashland, on the Montreal River and on the Wisconsin Central, the Chicago & North Western and other railroads. The chief industries are lumbering and mining, and an extensive trade in connection with these activities is carried on. Some of the most productive iron mines in the United States are within the city limits, and the celebrated "Norrie mine" is in the immediate vicinity. Large deposits of coal and pottery clay are also found here. In the city are rolling mills, foundries, machine shops, wire-drawing and nail works, blast furnaces and manufactories of stoves, boilers, machinery, fire brick, doors, mantels and furniture, lumber and cement. The town is connected by trolley with Hurley and Gile, Wis. Chief among the notable buildings are the Luther L. Wright High School, the Carnegie Public Library and a fine city hall. Ironwood was settled in 1884 and incorporated three years later; it is governed under a revised charter of 1893. Population in 1920, 15,739.

Iroquois, *Ir" o kwoi',* the name applied by the French to the Indian confederation occupying the central part of New York and called by the English the Five Nations; later they were called the Six Nations. The nations forming the confederacy were the Cayuga, Mohawk, Oneida, Onondaga and Seneca. Later the Tuscaroras were admitted. The Iroquois were farther advanced in civilization than other tribes. They were systematic tillers of the soil and had a well-organized system of government. They constructed large houses covered with bark and divided into several compartments, each being occupied by a family.

The Iroquoian family originally included a large number of tribes. They occupied the region along the St. Lawrence River and around the Great Lakes. They were conquered by the Algonquins and driven southward. Later they returned to New York, where they became a powerful organization. Between them and the Hurons there was a deadly feud. Champlain, by siding with the Hurons, incurred the enmity of the Iroquois, who sided with the English in the long struggle between the French and English. Most of them remained neutral during the Revolutionary War, but their sympathies were with the British. The Cayugas and Mohawks under Joseph Brant joined the British forces. After the war these settled in Canada, and their descendants now occupy the villages of Caughnawaga and St. Regis. There are now about 17,000 of them, of whom 8000 are in Canada, and the others in the United States. Most of them live in New York, where they have become an educated and prosperous people.

Irrawaddy, *Ir" ah wah' dy,* or **Irawadi,** a river of Burma. It crosses Upper and Lower Burma and empties into the Bay of Bengal through a large delta. It is 1500 m. long and is nagivable for about 1000 m. The valley through which it flows is very fertile, with a population devoted almost wholly to agricultural pursuits.

Irrigation, supplying arid lands with water for agricultural purposes by artificial means. In all parts of the world there are large areas of land that are not productive, because the soil does not receive enough moisture to enable plants to grow. From the remotest ages people inhabiting such regions have resorted to irrigation, and, although the earliest methods were crude, they were in principle the same as those in use at the present day. The valleys of great rivers have always been the most densely populated regions largely because water could be drawn from the river to irrigate the land.

THE OLD WORLD. The wonderful fertility of Egypt has always been due to the Nile, and the ability of Mesopotamia

to support the great nations of former times was due largely to the skill of the people in using the waters of the Tigris and Euphrates to irrigate the plains. In Egypt the work of irrigation has been greatly extended and improved under management of the British Government, which erected the great dam at Assuan. This structure, when first completed, was 6600 ft. long, 120 ft. high and formed a reservoir of sufficient size to hold all the surplus water of the Nile from December to the next period of high water. The height of the dam has since been raised and the area of the reservoir proportionately increased, so that now it holds enough water to irrigate 6,000,000 acres. This is in addition to the irrigation provided by works farther up the river and those on the Lower Nile. Extensive areas are also under irrigation in India, estimated by good authority at over 22,500,000 acres, and in China irrigation has been practiced for several thousand years. Spain, Italy and France also depend upon irrigation to some extent.

UNITED STATES. When the Indians in Mexico and the southwestern part of the United States were discovered they were employing rude methods of irrigation. The missionaries followed the Indians and improved upon their methods, so that irrigation has been a means of maintaining agriculture in the extreme southwest for an indefinite time. However, it was not introduced on a large scale until 1847, when the Mormons emigrated to Utah and by spreading the water of the mountain streams over the desert transformed a barren waste into fruitful fields. Later the success attained by the Mormons led to the construction of other irrigation systems, and the Colony of Greeley, Colo., was founded on irrigated land in 1870; from this date the work extended rapidly throughout the arid regions. Within a few years it became evident that the construction of works for irrigating large areas would incur such expense that they should be undertaken only by the state or Federal governments.

The Carey Act. The Carey Act was passed by Congress in 1894 as a step towards securing state aid for irrigation projects. This act grants 1,000,000 acres of desert land to each state in the arid region provided the state will reclaim the land. Five states, Colorado, Idaho, Oregon, Washington and Wyoming, at once accepted the grant and other states followed. Under this act the state grants water rights to a construction company and then sets aside the land to be irrigated. The state conveys the title of the land to the settlers who pay the construction company a fixed price for water privileges. This payment is usually made in ten equal annual installments. When 90 per cent of the land has passed to the title of private owners, the construction company must retire and turn the project over to the settlers.

Under this law large areas have been irrigated. Its operation has proved so successful in Idaho, that the state has applied for and received 4,000,000 acres in addition to the 1,000,000 in the original grant.

The Reclamation Law. This law was passed by Congress in 1902, and in its effect is one of the most far-reaching of land laws enacted by the National Government. This law (1) created a reclamation fund from the sale of public lands in the arid and semiarid states. This fund is held in the Treasury of the United States. (2) It established a reclamation service in the United States Geological Survey to investigate and report upon irrigation projects, such reports to receive the approval of the secretary of the interior before the project is undertaken. (3) It provided for the return to the fund of the actual cost of each project by the sale of water rights, the payments to be made in ten annual installments. (4) It provided for the holding of public lands for actual settlers, under the Homestead Act, in small tracts sufficient to support a family. (5) It restricted the sale of water rights to private owners so that each owner cannot secure rights to more than 160 acres. This makes land monopoly in the irri-

gated districts impossible. (6) It provided for the final turning over to the people, of the irrigation works, except the reservoirs, to be managed by them under systems of local control.

By the provisions of this law the settlers repay the government for the reclamation project from which they derive the water, and the money so returned can be used in the construction of other projects. Since the law became effective the government has undertaken large projects in Arizona, California, Kansas, Nevada, North Dakota, Oregon, South Dakota, Utah, Colorado, Idaho, Montana, New Mexico and Washington. Some of these have been completed, and when all are brought to completion they will add upwards of 2,000,000 acres, or an area greater than the combined areas of Delaware and Rhode Island.

One of the most noted projects is the Salt River Project in Arizona. The dam across the canyon of the Salt River, known as the Roosevelt Dam, is 235 ft. long at the bottom and 1080 ft. long at the top. The wall at the bottom is 165 ft. thick, and at the top it is thick enough to form a good wagon road. The top of the dam is 280 ft. above the lowest foundation and the water rises against the wall 230 ft. This dam creates a lake 18 m. long and 4 m. wide, a body of water sufficient to irrigate 200,000 acres. The Yuma Dam in California provides for irrigating 85,000 acres. The Huntley and Milk River Project in Montana will supply water for 235,000 acres; the Molheur in Oregon, 100,000; and the Klamath Falls Project in California and Oregon, 236,000 acres. The Uncompahgre Project in Colorado required the construction of a tunnel 6 m. long through a mountain. Between 1902 and 1912 the government planned and began work on 28 of these large projects. However, the land irrigated by private means and under the Carey Act exceeds by far the land that will be benefited by these combined projects.

The following statistics show the status of irrigation in the United States at the close of 1911:

Total number of acres irrigated	14,463,148
Miles of ditches	125,615
Number of reservoirs	6,933
Capacity of reservoirs (acre foot)	12,872,256
Number of flowing wells	5,070
Number of pumped wells	14,544
Number of pumping plants	13,951

CANADA. The chief irrigation projects in Canada are found in the southwestern part of Alberta, along the Bow River, where the Canadian Pacific Railway has undertaken one of the most extensive projects in the world. The Northwest Provinces are also encouraging irrigation where it will aid in increasing the extent and value of crops.

WHERE NEEDED. Irrigation is needed where the annual rainfall is less than 20 inches, or where it occurs during months in which crops cannot be grown and to flood land for growing rice. There are about 175,000,000 acres of arid lands in the United States. Of this land, over 14,000,000 acres have been reclaimed, and according to conservative estimates there is enough water to irrigate about one-fifth of the entire acreage, or 35,000,000 acres. When this land is all reclaimed, it will add to the productive area of the United States territory equal to the area of Wisconsin. Crops on irrigated land are more certain than those depending upon rainfall, for they are sure of sufficient moisture at the time it is needed. But irrigation is not successful on large farms. It is most profitable on farms varying from 10 to 50 acres and devoted to raising fruit and garden vegetables. Nearly one-half the present crop of California is raised on irrigated land.

METHODS. Water for irrigation is obtained from three sources: streams, reservoirs and wells. Streams are the most desirable source because water can be obtained from them at least expense. The river is usually tapped at a point in its course having sufficient altitude to assure a flow of water to the land to be irrigated. A canal is excavated from this point to the highest level on the ir-

THE ROOSEVELT DAM

rigated land. From this canal branch canals conduct the water to various parts of the land. From these branch canals, ditches and small channels distribute the water evenly over the area to be irrigated. The amount of water allowed each settler is regulated by law, and when a settler has used his share he can have no more. Supervisors constantly ride over the irrigated districts and see that no one takes advantage. Water is measured by the acre foot, that is, the quantity necessary to cover an acre to the depth of one foot; and by the inch, that is, by the quantity of water that will flow through an opening one inch square four inches below the surface. The acre foot is the most common unit. Reservoirs are constructed for the purpose of impounding water that accumulates at a time when it cannot be used and holding it until the growing season. In a few sections flowing wells are found, but most of the water obtained for irrigation from wells is pumped. The preservation of forests tends to preserve the uniform flow of streams and to prevent a decrease in the rainfall; hence there is a close relation between irrigation and conservation. See CONSERVATION; FORESTRY.

Ir'ving, Sir Henry (1838-1905), an English actor whose original name was John Brodribb, born in Keinton-Mandeville. He began his career as an actor in 1856. His rôles in *Richelieu, Eugene Aram, The Bells* and *Charles I* were popular, and in 1874, while playing *Hamlet* in the Lyceum Theater during a run of 200 nights, he gained recognition as one of the greatest English actors. In 1878 he leased the Lyceum Theater, and for a long time acted with Ellen Terry, who played Ophelia to his Hamlet and Portia to his Shylock. Other successful Shakespearean performances were *Macbeth, Othello, Richard III, Twelfth Night* and *Romeo and Juliet.* His later rôles were Mephistopheles, King Arthur, Napoleon, Becket and Robespierre. He was knighted in 1895. The chief merits of his acting were originality and freedom from restraint and convention.

Irving, Washington (1783-1859), a distinguished American author, born in New York City. After a somewhat meager schooling, which ended when he was 16, Irving entered a law office, varying his studies there by writing articles for the *Morning Chronicle.* A trip to Europe in 1804, undertaken for his health, stimulated his literary inclinations, and on his return to New York in 1806, he became interested in a periodical of the nature of the *Spectator,* entitled *Salmagundi.* The essays were written in conjunction with his brother William and James K. Paulding, and gave sure evidence of his talents as a humorous writer. In 1809 his first important book appeared, the "Knickerbocker" *History of New York,* a droll and quaint satire of the stolid Dutch burghers of New York.

In 1810 Irving joined two of his brothers in a commercial enterprise, a branch of which was established at Liverpool, and in 1815 he went abroad to look after his affairs. He had already gained a reputation among English readers, and he immediately won popularity in literary circles, becoming friendly with Campbell, Jeffrey, Moore and Scott. The failure of his business house in 1818 induced him to resume his literary work, the first fruits of his activity being *The Sketch Book* (1819-1820). This collection of sketches on English life and scenes was varied by a few stories on American themes, notably *Rip Van Winkle* and *The Legend of Sleepy Hollow,* and it represented admirably Irving's quaint humor, refined tastes and graceful style. It gained the author renown on both sides of the Atlantic. His observations of English country life were set forth in *Bracebridge Hall,* which followed in 1822. *Tales of a Traveller,* appearing in 1824, resembled *The Sketch Book* in character. In 1826 Irving was made attaché of the American legation at Madrid, and from 1829 to 1832 he was secretary to the American legation in London. His residence in Spain made possible some independent research among old Spanish documents, and the

result was four works expressing an American's interest in the romantic, picturesque Spain of long ago: *History of the Life and Times of Christopher Columbus* (1829), *A Chronicle of the Conquest of Granada* (1829), *Voyages and Discoveries of the Companions of Columbus* (1831) and *The Alhambra* (1832).

Irving returned to America in 1832, where he was proudly welcomed as the first American who had won literary distinction abroad. Building for himself a charming home at Tarrytown on the Hudson, which he called Sunnyside, he spent the remainder of his life in America, with the exception of four years (1842-46), when he served as ambassador to Spain. Before his departure to Spain he wrote *Astoria,* a lively history of the fur-trading settlement founded by John Jacob Astor in Oregon. His later works were biographical in character; Oliver Goldsmith, Mahomet and his successors, and George Washington were the subjects of his study. His last years were spent quietly and happily at Sunnyside, where an attractive personality and charming conversational powers made him a popular host. His life and character were in every respect above reproach. He never married, remaining loyal to the memory of an engagement made in early life and severed by death.

Irving is the most eminent of those writers who first appear in American literature after it had ceased to be chiefly theological and political in expression. A contemporary of James Fenimore Cooper, he is associated with that novelist as a writer of wholesome fiction. Irving, however, attempted and perfected a form of fiction that had received little attention—the short story. This is his most notable service to literature. His principal merits are a sense of the artistic, and purity of style—a style that expresses with unfailing charm his quaint humor, delicacy of sentiment and appreciation of the beauties of the romantic past. His biographies are characterized by vividness of imagination and admirable literary execution rather than a critical and trained scholarship. Irving had no message to give of a new revelation of life, nor was he a powerful writer, but his success in perfecting the work for which he was particularly adapted makes him a permanent literary figure.

Isaac, *I′ zak,* (laughing), one of the Hebrew patriarchs, the son of Abraham and Sarah. He was thus named because of the joy attending his birth, when Abraham was 100 and Sarah 90 years of age. Among the notable incidents of his life were his miraculous escape from death, as a sacrificial offering, and the deception practiced upon him by his son Jacob. Isaac died at the age of 180 years, and was buried in the cave of Machpelah, the burying ground of Abraham and his family.

Is″abel′la I (1451-1504), Queen of Castile and wife of Ferdinand of Aragon. Her moral influence was great, and she raised the corrupt court of the beginning of her reign to a "nursery of virtue." She had a clear intellect, was a true patriot and contributed much to the grandeur of Spain in her day. The chief events of her reign were the discovery of America, the conquest of Granada and the expulsion of the Moors.

Isaiah, *I za′ yah,* (salvation of Jehovah), the first of the great Hebrew prophets; also the name of the prophetic book in the Old Testament of which he is the reputed author. Isaiah, son of Amoz, is believed to have been of the royal line of Judah. Beginning his prophecies in the last year of Uzziah's reign, he reproved and warned in vain until the time of Hezekiah, who heeded his warnings and made him his adviser. Isaiah is said to have been sawn asunder in the reign of Manasseh, when he was about 90 years old. The book of *Isaiah* consists of a series of visions, followed by certain prophecies and historical facts. In the second portion of the book is a forecast of the period between the Captivity and the close of the Christian Dispensation, the return from Babylon being made to symbolize

the birth of Christ and the redemption of the people. A number of remarkable prophecies concerning the birth, passion and rejection of the Messiah occur, which are couched in language of great beauty and power. See BIBLE, subhead *The Old Testament.*

Ishmael, *Ish' ma el,* the son of Abraham and the Egyptian bondmaid, Hagar. He married an Egyptian wife and had one daughter and 12 sons. The daughter became the wife of Esau. The descendants of Ishmael are known as Ishmaelites.

Ish'peming, Mich., a city of Marquette Co., about 15 m. w. of Marquette, on the Chicago & North Western, the Duluth, South Shore & Atlantic, the Lake Superior & Ishpeming and other railroads. The city is 1400 ft. above the sea level (hence its Ojibway Indian name, said to mean high-up), in the center of the iron-ore mining industry of the state, and contains at least six mines within its limits. In the vicinity are also deposits of gold and marble and quantities of building stone. Settled in about 1857, Ishpeming is administered under a revised charter of 1891. Population in 1920, U. S. census, 10,500.

Isinglass, *I' zing glas,* the pure form of animal gelatin. It was formerly obtained from the air bladder of the sturgeon, but the cod, hake and other fishes furnish the American product. It is used in the manufacture of glue, court plaster, a cement for glass and porcelain and for refining wines. By boiling it in milk, jellies are made. It also acts as a size for stiffening textiles. The name has been popularly but incorrectly applied to sheets of mica, which resemble isinglass and which are used as panels in stove doors. See GELATIN; GLUE; MICA.

I'sis, the chief Egyptian goddess and the wife and sister of Osiris. She typified the moon and was usually represented with lotus blossoms on her head and an Egyptian harp in her hand. The worship of Isis and Osiris was carried from Egypt to Greece and Rome but never gained a great following. The cow was sacred to Isis, and for this reason she is frequently pictured as wearing horns.

Is'lam. See MOHAMMEDANISM.

Island Number 10, an island which, until about 1866, existed in a bend of the Mississippi River, some 40 m. south of Columbus, Ky. After the fall of forts Henry and Donelson, it was a fortified Confederate post, with large stores, held by General Mackall. Early in March, 1862, 40,000 Federals under Pope, assisted by a fleet under Commodore Foote, advanced from Cairo against the position; but though they invested New Madrid, on the Missouri shore, their bombardment of Island Number 10 was of no avail. At length the Federal engineers cut a channel across the peninsula formed by a loop in the river, and General Pope was thus able to attack the Confederate rear and cut off their retreat, forcing the garrison of about 7000 men to surrender on Apr. 7. The river has gradually washed away the island.

Isle of Pines, an island of the West Indies, lying in the Caribbean Sea 35 m. s. of Cuba, to which it belongs. It is a beautiful little island, attractive to tourists and to settlers, especially because of its delightful climate and its far-famed mineral springs. The coast is indented by large bays, and there are many safe and secluded, though shallow, harbors. The Isle of Pines has picturesque mountains of colored marble, rolling plains and beautiful rivers. Modern hotels, sanatoriums and settlements attest its growing popularity as a winter health resort. Coconut groves and forests of cedar and mahogany are common. Cattle, tobacco, pineapples, turpentine, tar, pitch, marble and tortoise shell are the principal products. The island has an area of 986 sq. m., or a little less than Rhode Island, and its population is about 5000.

I'sobars, lines drawn on a map connecting adjacent points having the same atmospheric pressure. A map thus delineated is called an isobaric map or chart. It may show the average pres-

sure throughout the year or for a season, for a month or even for any shorter period. The daily weather maps prepared by the United States Weather Bureau are daily isobaric charts. All weather maps show isobars and isotherms on lines connecting places of equal temperature. See BAROMETER; ATMOSPHERE; WEATHER BUREAU.

I'sotherms, lines upon the map connecting places which have the same temperature. Each line represents a difference of 10° of temperature between the points through which it passes and those traversed by the lines on each side. If the earth's surface were all water or entirely solid matter and perfectly level, all places having the same latitude would have also the same temperature. But this is not the case, and differences in temperature are caused by elevation above the sea level, by the location of oceans and continents, by oceanic currents and by winds; so that, although isothermal lines have a generally east and west direction, they follow a somewhat zigzag course. Isothermal maps, like isobaric charts, are constructed with reference to the sea level and represent not the actual temperature of a region, but the temperature which would exist by reason of humidity, altitude, etc., if the place were at sea level.

Ispahan, *Is" pa hahn',* one of the largest cities of Persia and its former capital. It is situated on the Zendeh Rud River, more than 200 m. south of Teheran. A wall about 23 m. in extent encloses the city with all its ancient ruins, its present magnificent palaces and mosques, and its bridges remarkable for architectural beauty. The manufactures include woolen and cotton goods, silk, leather goods, arms, jewelry and footwear. On the main route from Teheran to Abushehr, Ispahan still has commercial importance, although it is no longer the emporium of the Asiatic world. It is thought to have been founded by Jews, made captive by Nebuchadnezzar. When it was devastated by the Afghans in 1722 the government was transferred to Teheran. Population, about 80,000.

Israel, *Iz' ra el,* **Kingdom of, the name** applied to the Hebrew monarchy established when the ten tribes, under the leadership of Jeroboam, revolted, after the death of Solomon, about 937 B. C. (See JEROBOAM; SOLOMON). Previous to this the name Israel had been the national designation of the whole people. After the separation the two kingdoms were known as Israel and Judah respectively. The history of the Kingdom of Israel is a story of decay and dissolution. In 722 B. C. Sargon II, King of Assyria, captured Samaria, the capital city, and carried away the ten tribes into captivity, in which they are "lost" to history.

Israelites, *Iz' ra el ites.* See JEWS.

Israëls, *Ees" rà ales',* **Josef** (1824-1911), one of the greatest of recent Dutch painters, born at Groningen, of Jewish parents. He studied at Amsterdam and later in Paris, finally settling in The Hague. The most of his pictures deal with humble life. His style is rugged and direct, and he is most successful in pictures that tell a story of suffering and woe. Among those of his pictures that have a compelling interest are *Alone in the World, The Toilers of the Sea* and *The Silent House.*

Is'sus, Battle of, a battle fought in 333 B. C., between the forces of Alexander the Great and the Persian army under Darius. The Persian army numbered 600,000, but Alexander gained a sweeping victory, which prepared the way for his conquest of western Asia. Issus was a seaport in Cilicia, Asia Minor, on what is now the Gulf of Iskanderun.

Isthmian, *Is' mi an,* **Games,** athletic games held regularly after B. C. 582 in the spring of the second and four years of each Olympiad, under the general direction of the Corinthians. They were open to all Greeks except the Eleans. The contests were similar to those listed among the Olympian games, and included boxing, wrestling, throwing the discus, various foot, horse and chariot races and, at one period, musical competitions. The victors were rewarded only with a palm

branch and a wreath of parsley, or with wreaths of fir or of dry and withered ivy; but these were quite sufficient to insure permanent fame for the individual. See OLYMPIAN GAMES.

Italian Language. See LANGUAGE, subhead *Modern Romance Languages.*

Italian Literature. See LITERATURE, subhead *Italian Literature.*

Italian Somaliland, *So mah' le land',* an Italian protectorate of eastern Africa, stretching along the coast of the Indian Ocean from British East Africa to the Gulf of Aden. The country has not been fully explored and is not greatly developed. The government is chiefly administered by native chiefs, although there is an Italian governor. The country is supposed to have great natural resources. Population, about 400,000.

Italy, a kingdom of southern Europe, and the central of the three great peninsulas projecting into the Mediterranean Sea. It is bounded on the north by Switzerland and Austria; on the east by Jugo-Slavia, the Adriatic and Ionian Seas; on the west by France and the Mediterranean Sea. The peninsula is about 700 miles long and has an average width of about 100 miles. The total area of the mainland including recent acquisition from Austria is about 97,000 sq. m. In addition to the peninsula, Italy comprises the islands of Elba, Sicily, Sardinia, and smalled groups; and a stretch of the eastern shore of the Adriatic Sea, including a part of Dalmatia. The estimated total area of Italy is now about 117,000 sq. m. The recent acquisitions of territory at the north end of the peninsula (the Tyrol) at the head of the Adriatic Sea and the east shore restore to Italy territory ruled by the city republic of Venice. Strategically, the position of Italy has been greatly strengthened.

SURFACE. The Kingdom of Italy consists geographically of three parts: the Continental, the Peninsular and the Insular. The Alps border the Continental area on the north; that part of the mountain region which is in the extreme northeast of the country is known as the Piedmont. Here is also found the Valley of the Po, or the great plain of Lombardy. The Peninsular region is practically filled by the Apennine system. The Northern Apennines, known also as the Ligurian, or Ligurian Alps, partly enclose the Gulf of Genoa and extend as far as the source of the Tiber; the Central Apennines center around the region of Abruzzi; the Southern Apennines reach to the Gulf of Taranto and southward. The Insular region is also mountainous and volcanic, and forms a continuation of the mountain system of the peninsula. Only about one-third of the whole area of the kingdom is made up of plains. The Valley of the Po forms the greater part of this territory. The total length of the coast line, including that of the islands, exceeds 4000 m. Practically the whole territory is easily accessible to the sea, and its position makes it of importance for commercial routes in all directions.

RIVERS AND LAKES. The largest river is the Po, flowing into the Adriatic Sea, and navigable as far as Turin. Other important rivers are the Adige, the Arno and the Tiber. Many of the beds of the minor streams are dry in summer. The lakes of Italy are distinguished for their beauty, the Lago di Como being considered the most beautiful lake in the world. Others are Garda, Maggiore, Lugano and Iseo.

CLIMATE. The atmosphere of Italy possesses a singular degree of clearness, which intensifies the outlines of its mountains, towered cities and castles until a spectacle of great charm is produced for the wondering eye of the tourist. There are four climatic areas: the northern coincides with the Valley of the Po, and extremes of temperature are frequent; the eastern and western coasts of the Peninsular region differ in that the western slope is generally warmer than the eastern; in southern Italy and on the islands the climate is warm, and the difference between the summer and winter temperature is only 25°. Irrigation is necessary because the greatest amount of rain falls in the autumn and winter months after the season of productivity.

ITALY

MINERALS AND MINING. Sulphur constitutes the richest mineral wealth of the country, and nearly supplies the demand for the whole world. Some anthracite is found in the Piedmont region; lignite is mined in Sardinia, Umbria and Tuscany. Iron ore, zinc ore, copper, silver, gold, antimony, lead, marble, rock salt and petroleum are more or less abundant.

AGRICULTURE. The varied climate, by reason of the wide range of both altitude and latitude, allows for the production of practically all the crops of Europe, as well as of many of the tropical regions. The temperate climate allows for at least two harvests per year, and in the plains of Campagna a larger number are grown. One of the most important cereals raised is wheat. Other products are corn, rice, barley, rye, oats, potatoes and beets. More valuable than its yield of cereals is the country's annual production of fruit, and wine making has become a scientific industry. Olives, oranges, lemons, almonds, dates and figs grow in large quantities. The mulberry tree is cultivated for its value in relation to silk culture. Italy now ranks second only to China and Japan, among the countries of the world, as a producer of raw silk. There is little stock breeding, except in the northern part of the country, where horned cattle and horses are bred. Fish breeding is largely carried on. The forests occupy over 15 per cent of the territory, and efforts are constantly made to reclaim what has been carelessly lost by the planting of new trees. A large part of the area under forests is in chestnuts.

MANUFACTURE. Excluding the production of raw silk and a fairly large amount of silk spinning and weaving, the manufactures of Italy are not in a high state of perfection. In the manufacture of art products Italy has the distinction of supplying works of great beauty and artistic finish. Of such nature are its small metal wares, pottery, glassware, alabaster and marble products. Paper, straw hats, leather goods and chemicals are also produced.

COMMERCE AND TRANSPORTATION. The imports exceed the exports in quantity, and consist principally of wheat, raw cotton, coal, machinery, timber, raw wool, fish and hides. The chief exports are silk, wine, sulphur, olive oil, fruit, eggs, flax and raw hemp. The trade has been chiefly maritime, but the opening of numerous Alpine tunnels has facilitated land transportation to the Continent. The railroad system consists of the two groups, the Mediterranean and the Adriatic, separated by the Apennine mountain range. The total railroad extent exceeds 10,000 m. The highways, national, provincial and communal, are elaborately constructed and carefully maintained.

INHABITANTS. Peoples have migrated to Italy both from the North and the South, but despite the peculiar mixture of races, an extraordinary degree of unity of speech now exists in the country. The original inhabitants were the Iberians, Ligurians, Italians, Illyrians and Etruscans. The Latin language was adopted during the Roman period. Of the present local dialects of the Italian language, the Tuscan is the purest.

LITERATURE. See LITERATURE, subheads *Roman Literature* and *Italian Literature.*

GOVERNMENT. The constitution vests the hereditary power in a king of the House of Savoy. The only control of his authority is that the measures he accepts shall be countersigned by a minister, who by that act assumes responsibility for the same. The ministers in turn are responsible to the lower house of Parliament. The 11 administrative departments of which they have charge are: the interior, foreign affairs, the treasury, finance, justice and religion, war, marine, commerce and industry and agriculture, public instruction, posts and telegraphs, and public works. The Senate and a Chamber of Deputies have legislative control. The members of the Senate are the princes of the royal blood, who have reached their majority, and men chosen by the king from certain classes, provided for under the consti-

tution, all of whom must be at least 40 years of age. The senators now number 325. There are 508 members in the Chamber of Deputies. They are chosen by citizens qualified by a modified educational restriction. No other compensation for services rendered by senators and deputies is obtained except free passes over Italian railroads. Both the administrative and the judicial systems are a close model of those of France.

RELIGION. The Roman Catholic Church claims by far the largest number of the inhabitants. Rome is the seat of the central administration of the Church, and for this reason the Church as such has played an important part in the history of the inhabitants. The Greek Orthodox Church has a smaller per cent of representatives, and there are about 66,000 Protestants and over 35,000 Jews.

COLONIES AND CITIES. The colonial possessions of Italy are those of Eritrea on the Red Sea, Italian Somaliland and Tripoli. The principal cities are Rome (the capital), Venice, Naples, Genoa, Florence, Palermo and Milan.

HISTORY. The history of modern Italy begins in 476 A. D., when the barbarians made their leader, Odoacer, King of Italy. He was conquered in 493 by Theodoric the Great, King of the Ostrogoths, who united the whole peninsula under his wise and firm rule. A little after his death the country fell into the hands of Justinian, and the rising greatness of Italy was checked by the invasion of the Lombards in 568. Charlemagne received Italy with the other Roman possessions when he was crowned Emperor of Rome by the Pope, in 800.

By the Treaty of Verdun, 843, Italy became the inheritance of Lothair, and a period of misrule followed for over a century. In 962 Otto I was crowned Emperor of the Holy Roman Empire, and from this time there were many wars between the emperors and the northern city states into which the Lombard Kingdom had disintegrated. The Lombard League defeated Frederick I and forced him to give up all real authority over them in 1183. The parties of the Guelphs and Ghibellines rent Italy with dissension in the 11th and 12th centuries (See GUELPHS AND GHIBELLINES). The German emperors finally lost all authority in Italy, and by the 15th century the country was occupied by five powers—Venice, Florence, Milan, the Kingdom of Naples and the Papacy.

Italy became the scene of struggles between the emperors of Germany and France early in the 16th century. The invasion of the country began in 1494, when Charles VIII of France attempted the conquest of Naples. Francis I was defeated at Pavia in 1525 by Emperor Charles V, and four years later he was obliged to give up all claim to Italian territory. Charles V gained Milan and Naples in 1535, and Austria acquired both, with Sardinia, early in the 18th century. Thus held by foreign powers, all expression of national life disappeared and was not revived until the time of the French Revolution. When Italy joined the powers against France, she was conquered and reduced to a mere dependency by Napoleon. Venice was given to Austria, and the remainder of the country was divided into republics, except Naples, which was made a kingdom in 1806 and ruled by Joseph Bonaparte and Murat.

By the Congress of Vienna (1814-15), Italy was almost all divided between Austria and the Papacy. Longings for a united Italy began to express themselves by conspiracies and secret meetings, and when Charles Albert of Sardinia gave a liberal rule to his people the patriots rallied about him as the national liberator. In 1848, the popular discontent forced constitutional rights from Naples and Rome, while the people of Milan drove the hated Austrians from their city. Charles Albert entered Lombardy, but he was defeated at Novara in 1849 and was forced to abdicate in favor of his son, Victor Emmanuel.

Victor Emmanuel was an intensely pa-

triotic young prince. He wisely followed the policy of his great minister, Cavour (See CAVOUR, CAMILLO BENSO DI), to strengthen Sardinia and to gain allies for another struggle for Italian liberty and unity. Cavour shrewdly joined England and France in the Crimean War against the Russians, while Austria preserved a rather inglorious neutrality. Thus Sardinia was allowed representation in the Congress of Paris in 1856. Through the diplomacy of Cavour, Louis Napoleon was drawn into a secret alliance, Austria was lured into making an attack, and after the Italian victories of Magenta and Solferino (1859) the Austrians ceded Lombardy, which was added to Sardinia.

The next step toward Italian unity was taken when the duchies of Parma, Modena and Tuscany drove out their rulers and voted in 1860 for annexation with Sardinia. This annexation increased Sardinia more than one-third. The third step followed in the same year, when the hero Garibaldi made his wonderful conquest of Sicily and Naples (See GARIBALDI, GIUSEPPE). As a reward for her help to Prussia against Austria in 1866, Italy received Venice as her fourth acquisition, and when the Franco-German War began in 1870, Napoleon III recalled the French troops from Rome, and Italy quietly took her ancient capital and became a free, united country.

Victor Emanuel III came to the throne in 1900, succeeding Humbert I, who was assassinated that year. The war with Turkey in 1911 resulted in the acquisition of Tripoli. The great event of recent Italian history was the participation of Italy in the European war of 1914. Though a member of the Triple Alliance, Italy was not bound to assist in an offensive war. In addition, there was the old question of territory around Trieste and Trentino, held by Austria though the inhabitants were mainly Italians. This was the old question of *Italia Irridentia,* or unredeemed Italian territory. Italy entered the war in 1915. In 1918, American soldiers were fighting with Italian forces, along the Piave, in defense of Italy. This campaign among Alpine peaks and defiles in Northern Italy will rank in history as one of the greatest campaigns of the war. Population in 1916, 36,546,437.

Itch, *Ich,* a contagious skin disease, which causes watery sacs to form on the skin and results in severe itching. It appears between the fingers and on the wrists, and later spreads to other parts of the body. The disease is caused by the itch mite, a microscopic organism which burrows into the epidermis and deposits its eggs in the upper cuticle. The eggs hatch in about ten days, and the disturbance spreads unless arrested. Local application of lard and sulphur will kill the mite and end the disease.

Ith'aca, N. Y., county seat of Tompkins Co., 56 m. n.w. of Binghamton, at the head of Cayuga Lake, on the Lehigh Valley and the Delaware, Lackawanna & Western railroads. The city has very picturesque scenery. Three streams, Cayuga Inlet, Fall Creek and Six Mile Creek, here enter the lake, which is a link in the chain of inland navigable waters, and communicates with the Erie Canal. Steamboats ply between this place and the village of Cayuga. The most noted of the falls is Taughannock, 215 ft. high, which is the highest waterfall east of the Rocky Mountains. Cornell University (nonsectarian) is located here and is picturesquely situated on East Hill overlooking the lake and the city (See CORNELL UNIVERSITY). Among other features of interest are several preparatory schools, Cornell Free Library, Renwick Park and several suspension bridges. Ithaca has an extensive coal trade. Its manufactures include castings, machinery, calendar clocks, farm implements, salt and wall paper. Population in 1920, 17,004.

Ito, *E' to,* **Hirobumi,** MARQUIS (1841-1909), a Japanese statesman. At the age of 20 he secretly boarded a foreign ship for Shanghai and later worked his passage to Europe before the mast. His eyes were opened by his travels to the

danger threatening Japan, if she did not adopt modern civilization, and he hastened back to his country when he learned that his feudal lord was about to defy the combined fleets of Great Britain, France, Holland and the United States. The bombardment that followed opened the eyes of the Japanese nobles, and they started a movement to restore unity in Japan. In 1871 Ito studied the coinage system of the United States, and his report caused the decimal system of money to be adopted in Japan. In 1876 Ito visited Europe again to study the constitutions of the different countries with the purpose of framing one for Japan. When he returned he was made prime minister, and carried out reforms, reconstructing laws and codes according to the principles of the Western jurisprudence. When a conservative party gained control in 1888, Ito retired to draw up with the others the constitution of February, 1889. It was liberal in all questions of religious and personal liberty, but made the minister responsible not to the legislative assembly, but the emperor.

Later, as prime minister, he directed the state during the war with China in 1894-5, and was successful in securing the Anglo-Japanese Alliance. In 1901 he went abroad for his health, and during his visit to the United States he received the degree of LL.D. from Yale University. During the war with Russia the advice of Ito was largely effective in shaping the course of diplomatic events. In 1906 he was appointed resident general to Korea, and during the discharge of his duties in that position he was assassinated by a Korean. Marquis Ito ranks among the foremost statesmen of his time and is often called the "Bismarck of Japan."

Ivan, *E van'*, Russian for John, the name by which several Russian czars are known. Ivan I was Grand Duke of Moscow from 1328 to 1340, and gradually gathered the territory which formed the basis of the Russian Empire.

IVAN III (1440-1505), Grand Duke of Muscovy, called the Great. He conquered Novgorod in 1478 and also acquired territory from the Lithuanians. He greatly increased the power of Muscovy, and may be regarded as the founder of the Russian Empire. In promoting civilization he had the first Russian code of law compiled and invited many scholars and artificers to settle in Muscovy.

IVAN IV (1530-1584), Prince of Muscovy, who became first Czar of Russia in 1547. He conquered the Mohammedan kingdoms of Kazan and Astrakhan. He tried to introduce European civilization by promoting a large immigration of skilled workmen into his kingdom. Family bereavements and the treachery of a bosom friend led to the evil part of his reign, when his cruel and violent deeds gave him the name Ivan the Terrible. He was still the farsighted statesman, however, and cultivated friendly relations with England. He unexpectedly acquired Siberia toward the end of his reign.

I'vory, the hard bonelike substance obtained chiefly from the tusks of the elephant, and produced also from the teeth or tusks of the hippopotamus, walrus and narwhale. Ivory is hard, glossy white in color, and takes a high polish, qualities which render it valuable for making many articles, such as knife handles, pianoforte keys and billiard balls. Ivory can be stained or dyed various colors, and its uses for ornamental purposes were known in early times; and later among the Greeks it was employed in making statues. The tusks of the elephant increase to 200 lb. in weight, and those from Africa are found most desirable on account of their density and whiteness.

Ivory Coast, a colony of French West Africa lying between Liberia and the Gold Coast Colony. The coast is flat, being bordered in the eastern part along the gulf by lagoons, and the plateau in the interior is nearly covered with impassable forests. The Cavally River forms the western boundary. Bingerville, the capital, is the residence of the lieutenant-governor, who is under

the governor-general of French West Africa. The population is 1,132,820, less than 200 of whom are French.

Ivory Palm, a low tree of the Palm Family, native in South America. It has a low stem from which the featherlike leaves extend in a huge, bushy cluster. The fruits grow in large bunches, which sometimes weigh 25 lb. The whole cluster is covered by a firm coat, within which are several large seeds that become very hard and resemble ivory in their whiteness and smoothness. These nuts are exported under the name of vegetable ivory, and are used in making buttons, tops of canes, ornaments and door knobs.

I'vy, a woody, climbing plant of the Ginseng Family, brought from Europe as a dooryard shrub. It has shining, evergreen leaves of varying shape. The flowers are small, greenish-yellow in color and, in consequence, rather inconspicuous. The fruit is a poisonous blackish berry, having a peculiar flat top surrounded by the remnants of the calyx and bearing in its center a small blunt stem. The leaves upon the flower stalk are oval or slightly pointed without irregularities of outline. This plant is the true ivy, or English ivy, spoken of in English lore and about which clusters many a tender sentiment. Its profusion upon ancient cathedrals, ruins and even the trees of the forest there connects it inseparably with the Englishman's thought of home, and it is to him a symbol of home life.

Iz'ard, George (1776-1828), an American soldier, born in Richmond, England, and educated at the College of Pennsylvania and at Edinburgh and other European universities. In 1794 he was appointed lieutenant of United States artillery and served successively as engineer of Castle Pinckney and commander of Ft. Mifflin and of West Point. He resigned from the army in 1803 but reenlisted at the breaking out of the War of 1812. He was appointed colonel of the second artillery and rose to the rank of major-general. He served on the northern frontier under Gen. Wade Hampton and then with General Brown around Niagara. His conduct aroused much popular criticism but was approved by the government. In 1825 President Monroe appointed him governor of Arkansas Territory, which position he held until his death.

J

JACANA, *Jak' a nah,* a name given a family of shore birds which are related to the plover. These birds resemble rails in their habits, frequenting ponds where they walk on the lily pads in their search for insects. They are peculiar for their long legs, long, slender toes, a leaflike scale on the forehead at the base of the bill, and the sharp spur on the bend of the wing. The family is found in most parts of the world.

MEXICAN JACANA. This bird is about the size of a robin; the head and neck are greenish-black, the wings are yellowish-green edged with dark gray, and the balance of the plumage is purplish-chestnut. This species is a common bird from Texas south to northern South America, Cuba and Haiti.

Jackal, *Jak' ol,* an animal of the Dog Family, found in the warmer sections of Europe, Asia and Africa and having its prototype in the coyote of America. Jackals are foxlike in appearance, having pointed muzzles, erect ears, slender legs and bushy tails. They live in burrows and come forth at night in packs to feed upon carrion or to prey upon small animals or weakened large ones. The cry of the pack is a prolonged howl with occasional snapping barks. The common jackal is yellow or reddish-brown in color; a South African species has a black back and tail, and a third species also found in South Africa is more wolflike in appearance and has a light stripe across each side. Jackals are occasionally tamed and are then, in habits, much like the domesticated dogs.

Jack'daw", a bird of the Crow Family. The jackdaw is about the size of the crow (14 inches long). The upper parts are black; the under parts, dark slate color; and the back of the head and neck gray. The nest is placed in holes in trees, in rock crevices, and in ruins of old buildings and church towers. It is very large and made of old sticks. Four to six greenish or bluish-white eggs spotted with brown are laid. The jackdaws are usually found in flocks of large size, and they are exceedingly noisy. The jackdaw is easily tamed and makes a most interesting pet. It ranges throughout Europe and western Asia, where it is very common about towns.

Jack'-in-the-Pul'pit, or **Indian Turnip,** an interesting spring woodland plant of the Arum Family. The flowers, which are inconspicuous, grow upon a smooth fleshy stalk, called the spadix, enveloped in a drooping, leaflike spathe, green in color or striped with brown and purple lines. The leaf stem is longer than that of the flower and bears dull green or brown-purple leaves of three leaflets. The fruit is a bunch of bright red berries terminated by a dry, withered spur. The plant grows from a bulb, which has a biting juice when raw; when cooked, the bulb is said to be a tasteless, though a nutritious, food. The berries were eaten by the Indians, who also used the bulb as a vegetable. The plant takes its name from the position of the spadix, which is similar to that of a preacher in an old-fashioned pulpit under a sounding board.

JACK-IN-THE-PULPIT

Jack'son, Andrew (1767-1845), seventh president of the United States, born in the Waxhaw Settlement on the border of the two Carolinas. He received but little education. When South Carolina was overrun by the British in 1780 Jackson enlisted in the volunteers for its defense at the age of 13, and was taken prisoner. At the age of 18 he began the study of law, but never gained much knowledge of it. He had other necessary qualifications in abundance, however, and in 1788 was made public prosecutor of the Western District of North Carolina, now the State of Tennessee, whither he had moved. His resolute and fearless policy in this position gained him many friends. In 1796 he was a member of the convention which formulated the constitution of Tennessee, and the same year was elected to represent the new state in the lower house of Congress. He became United States senator in 1797, but resigned the following year to accept an appointment as judge of the State Supreme Court, in which capacity he served until 1804.

In 1802 Jackson had become major-general of the state militia, and when the War of 1812 broke out he offered the services of 2500 men under his command, and was made major-general of volunteers. In an expedition against the Creek Indians, who had long been committing depredations and had now joined hands with the British, he broke their power in the battles of Talladega and Horseshoe Bend (1813). He was made major-general in the regular army and proceeded to Florida, then under Spanish rule, and, without orders, captured Pensacola, where the British had a base of operations. He established his military renown at New Orleans, where on Jan. 8, 1815, in the famous battle of that name, he repulsed 12,000 British soldiers with half that force.

In 1817-18 Jackson commanded an expedition against the Seminole Indians in Florida, seized Pensacola, executed two British subjects suspected of inciting the Indians, and practically conquered Florida, which had become a hotbed of disorder. A year later Florida was purchased from Spain, and in 1821 Jackson was appointed its governor. He again became United States senator from Tennessee in 1823. In 1824 he was defeated for the presidency of the United States, but four years later was elected by a large majority, and was reelected in 1832.

The election of Jackson marks a new era in American history, as he was the first presidential representative of the common people. He unfortunately introduced the "Spoils System" into our political life, dismissing something like 2000 office-holders to make places for his friends and partisans, as compared with 74 dismissals during the entire previous history of the nation. He vetoed the bill for the renewal of the charter of the United States Bank, and thereby precipitated a long and bitter contest. He issued a vigorous proclamation against the "nullification" movement in South Carolina in 1832, declaring it to be subversive of the Union and contrary to the Constitution. See NULLIFICATION.

Upon completing his second term of office Jackson retired to his home, the Hermitage, near Nashville, where he spent the remainder of his life. Jackson is one of the most commanding and picturesque characters in American history. He was a man of action rather than a thinker, decisive and unalterable in execution, whether right or wrong. Passionate, willful, arbitrary and domineering, but able, determined and forceful, he accomplished many things that a man of different mold could not have done. See Study Guides.

Jackson, Helen Fiske Hunt (1831-1885), an American poet and novelist, known also by her pen name of H. H. She was born in Amherst, Mass. In 1852 she was married to Maj. Edward B. Hunt, of the United States corps of engineers, and in 1875, several years after his death, to William S. Jackson, a banker of Colorado Springs, Colo. It was while she was living in the West that she observed the wrongs done to the Indian and began to make her pleas

to the government for improved treatment of its wards. Two of her novels, *A Century of Dishonor* and *Ramona,* were an appeal for justice in behalf of her heroes of Indian blood. The significance of *Romona* was increased by reason of its imagination, dramatic movement and beauty of description. Her other novels include *Mercy Philbrick's Choice* and *Hetty's Strange History* (both in the "No Name Series"), and books for children; she is also said to have written the popular "Saxe Holm" stories. Of more permanent value than her novels are her poems, many of them as genuinely lyrical and musical as any others that Americans have produced. They were collected and published under the title *Sonnets and Lyrics.*

Jackson, Mich., a city and county seat of Jackson Co., 70 m. w. of Detroit, 82 m. s.e. of Grand Rapids and 209 m. e. of Chicago, on the Grand River and on the Michigan Central, the Lake Shore & Michigan Southern, the Grand Trunk, the Cincinnati Northern and other railroads. The Detroit United Railway and the Michigan United Railway connect the city with Detroit, Kalamazoo, Battle Creek, Lansing, St. John's, Grass Lake and other near-by towns and cities. Jackson is situated on both sides of the river and has an area of nine square miles. The surrounding country is largely agricultural and there is an extensive trade in fruit, grain and farm products. Coal is mined in the vicinity. The city contains wide and well-paved streets and parkways lined with fine shade trees. There is a park system of 58 acres, Loomis Park being the largest. The residential districts are attractively laid out and there are many handsome suburban residences. A number of beautiful lakes lie on the outskirts of the city. The noteworthy buildings include the courthouse, armory, Federal Building, the Masonic and Elks' temples, City Club Building, Y. M. C. A. and Y. W. C. A. buildings, banks, an Athenæum and substantial business houses. There are about 30 churches.

The educational institutions include several high schools, public and parochial schools, a business college and a Carnegie library. Among the benevolent and charitable institutions are the city hospital and several sanitariums. The Michigan State Penitentiary, established in 1839, is located here, and the city is the seat of the state Odd Fellows' Home. Jackson has extensive manufacturing industries, which are represented by automobile factories, a spring and axle factory, flour and planing mills, foundries and machine shops, novelty works, railroad repair shops, drop-forge works and manufactories of acetylene-gas generators, aluminum castings, automobile supplies, awnings, tents, brass goods, brooms, brushes, corsets, carbonated beverages, dental specialties, galvanized iron, motors, refrigerators, leather novelties, oil stoves, furniture, flavoring extracts and perfumes, electric signs, paper and paper bags, bank and office fixtures, cement pipe, confectionery, mirrors, wire goods, chemicals, underwear, yeast and other diversified products.

The first settlement was made in July, 1829, by Horace Blackman of Tioga County, N. Y. The place was first called Jacksonburgh in honor of President Andrew Jackson. The present name was adopted in 1838. Jackson was incorporated as a village in 1843, and in 1857 was chartered as a city. Population in 1920, U. S. census, 48,374.

Jackson, Miss., a city, the capital of the state and the county seat of Hinds Co., about 40 m. e. of Vicksburg and 185 m. n. of New Orleans, La., on the Pearl River. Railroads entering the city are the Illinois Central, the Gulf and Ship Island, the Alabama & Vicksburg, the Yazoo & Mississippi Valley, the New Orleans & Great Northern and others. The city is in a cotton-growing section and has a considerable trade in this and other farm products. The manufactures are varied and include machinery, harrows, plows, cottonseed oil, fertilizer, bricks, sash, doors, blinds and spokes, staves, hubs and other lumber products.

Jackson has numerous handsome

buildings and several noteworthy institutions. Of the former the most conspicuous are the capitol, the United States Government Building and the governor's mansion. Among the latter are Millsaps College (Methodist Episcopal, South); Bellhaven College, a nonsectarian school for girls; Jackson College for negroes; state institutions for the deaf, dumb, blind and insane; the state library; and James Observatory. The Old Capitol is a point of interest, as are also the remains of fortifications erected here at the time of the Civil War, a statue of Jefferson Davis and a Confederate monument.

Settled about 1830, Jackson was incorporated ten years later. It was the scene of active campaigning in the Civil War. In 1863 it was occupied for a time by Federal forces under General Grant, and in the following year it was nearly destroyed by General Sherman. The city is administered under a commission form of government, adopted in 1912. Population in 1920, 22,679.

Jackson, Tenn., a city and the county seat of Madison Co., 85 m. n.e. of Memphis, on the Forked Deer River and on the Nashville, Chattanooga & St. Louis, the Illinois Central, the Mobile & Ohio and other railroads. Madison County has built, at the expense of $500,000, several hundred miles of graded and piked roads throughout the county, which are unsurpassed. In the surrounding district are produced quantities of fruits, vegetables and other farm products, and an extensive trade in cotton is carried on. The city contains cotton and cottonseed-oil mills, spoke and heading factories, brick and tile works, porch-column factories, plow works, bank- and church-furniture factories, woolen mills, grain mills, boiler and engine works and manufactories of carriages, confectionery, baking powder, gasoline engines, boilers, veneering, spokes, skewers and trousers. Here are located the Union University, Lane College (for negroes), the Methodist Conference Female Institute and St. Mary's Academy (Roman Catholic). A state experimental farm is maintained here. There are several college and public libraries. The municipality maintains two parks. Jackson was settled about 1820 and three years later was incorporated as a town; first chartered in 1854, it is now administered under a revised charter of 1907, by which the sale of intoxicating liquors is prohibited. Population in 1920, 18,860.

Jackson, Thomas Jonathan (1824-1863), an American soldier, better known as "Stonewall" Jackson, born at Clarksburg (now W. Va.), Va., and educated at West Point. Entering the second artillery, he served during the Mexican War. In 1851 he became professor of military tactics in the Military Institute, Lexington, Va., where he remained until April, 1861. During these ten years he was actively interested in the betterment of the negro. Though a Union man and opposed to secession, Jackson felt it his duty to enter the Confederate service, and early in the Civil War, as colonel, he commanded the "Army of Observation" at Harper's Ferry.

His first engagement was at Falling Waters. He was in command of a brigade in the Battle of Bull Run, where, on seeing him repel the furious charge of a New York regiment under Colonel Slocum, General Bee exclaimed, "There stands Jackson like a stone wall." Thereafter Jackson was known by the sobriquet of "Stonewall," and his troops were known as the "Stonewall Brigade." Shortly promoted major-general, he distinguished himself by victories at McDowell and Winchester, in the campaign against General Banks. In June, 1862, he joined Lee in defending Richmond against McClellan and later against Pope, and was active at Mechanicsville, Malvern Hill, Cedar Mountain and the second Battle of Bull Run. His force was conspicuous at Antietam and Fredericksburg, and at Chancellorsville, in May, 1863, almost annihilated a corps while attacking the Federal right under Howard. The same night, while reconnoitering, Jackson was accidentally shot by his own men, and from wounds and a sudden attack of pneumonia, died a

few days later. The death of Jackson was a severe loss to the Southern cause; for, although never tried with the command of a large force, he was Lee's ablest lieutenant and strategist.

Jacksonville, Fla., a port of entry, the county seat of Duval Co., and the metropolis of the state, located in the northeastern part of the state upon the St. Johns River, 27 m., direct, from its entrance into the ocean, and thus connected by steamship with all the important ports of the Atlantic. It is upon the Seaboard Air Line, the Atlantic Coast Line, the Georgia Southern & Florida, the Florida East Coast, the Southern and other railroads, and lies 138 m. s.w. of Savannah, Ga., and 165 m. e. of Tallahassee, the capital of the state.

Streets and Parks. Jacksonville is a delightful residence and resort city. It has wide streets macadamized or paved with shell and vitrified brick. The private grounds are spacious and are beautified by tropical and semitropical plants. There are five public parks within the city limits, and in one of these, Hemming Park, stands a handsome Confederate monument. Aside from these, there are many spots of great natural beauty about the city; the near-by lakes and rivers and the Everglades, where dwell the remnant of the Seminole tribe of Indians, all offer attractive places for recreation. The beaches upon the ocean, between 15 and 20 m. distant, also draw visitors the year around.

Public Buildings and Institutions. The city has many handsome public buildings, most of which are of recent construction. Prominent among these are the United States Government Building, the city hall, the courthouse, the Union Depot, the Masonic Temple, a new Carnegie library and many beautiful churches. Jacksonville's many attractions and its delightful climate attract so many tourists that several palatial hotels have been built to supply the need. These serve both as commercial and as resort hostelries. There are two large hospitals, St. Luke's and the De Soto, and a Confederate soldiers' home, the grounds of which are especially attractive. There are also the Daniel Memorial and St. Mary's orphanages. Jacksonville has an excellent system of pub lic schools, with modern, well-equipped buildings, and many active organizations housed in comfortable clubhouses.

Industries. Since the St. Johns River has been deepened and broadened, Jacksonville has rapidly increased in importance as a shipping point. Its most important exports are lumber, shingles and crossties made from the yellow pine of this region; other exports are cotton, naval stores, fruits, garden produce, kaolin, phosphates, turpentine and rosin. There are a large number of industries, including the manufacture of cigars, mattresses, palmetto fiber, ice and carriages; and lumber and planing mills and brickyards are located here. Just outside of the city is one of the largest ostrich farms of the United States and the only one of importance east of the Rockies.

History. Jacksonville is called the "Gateway of Florida." It was founded in 1822, although settlement had been made there six years earlier. It was named after Gen. Andrew Jackson, who was Florida's first territorial governor. The town was incorporated in 1833, but did not begin to grow rapidly until some ten years later. A disastrous fire swept over the city in 1901. Population in 1920, 91,543.

Jacksonville, Ill., a city and the county seat of Morgan Co., about 34 m. s.w. of Springfield and 93 m. n. of St. Louis, Mo., on the Mauvaiseterre Creek and on the Wabash, the Chicago & Alton, the Chicago, Peoria & St. Louis, the Chicago, Burlington & Quincy and other railroads. The city is situated in a fertile prairie and has extensive industrial interests, including railroad car shops, iron and brass foundries, brickyards, woolen and planing mills and machine and bridge works. It is the seat of Illinois College, the Jacksonville Female Academy, the Illinois Woman's College (Methodist Episcopal), Illinois State Conservatory of Mu-

sic, a state asylum for the insane and the state institutions for the education of the deaf and dumb and blind. Other institutions are the Passavant Memorial Hospital and Hospital of Our Saviour. Among the important buildings are a Carnegie public library, a city hall, courthouse and a fine high school. The interesting features include the Morgan County fair grounds, Duncan Park and Morgan Lake in the vicinity. Jacksonville, which was named in honor of Gen. Andrew Jackson, was founded in 1825 and was first incorporated in 1867. Population in 1920, 15,713.

Jack'straws", a game played with from 20 to 100 pieces of straw, or strips of wood, bone, ivory or other material from four to six inches in length. Sometimes the straws of wood or bone are carved to represent javelins or arrows, or other implements; and sometimes they are colored. Different values may then be assigned to the several pieces. After they have been thrown in a confused heap on some stable surface, each player in turn endeavors to extract, with a small hook and one at a time, as many as possible without disturbing others. He loses his turn to the next player whenever he moves more than one straw. When all have been removed, the player who has the largest number, or those representing the greatest value, wins the game.

Jacob, *Ja' kub,* one of the twin sons of Isaac and Rebekah and the brother of Esau (See ESAU). He was born 15 years before the death of Abraham. He was the favorite of his mother Rebekah, at whose instigation he tricked his father Isaac into giving him the blessing rightfully belonging to the eldest son, as recorded in *Genesis xxvii.* Obliged to flee from the anger of his brother, Jacob went to live with his uncle, Laban, whom he served for 20 years. During this time he married Laban's two daughters, Rachel and Leah. Returning to Canaan, he wrestled all night with an angel, and after his victory was renamed Israel (the hero of God). From this name comes the term *Israelites.* Jacob died about 1860 B. C. and was buried in the tomb of Abraham.

Jacobins, *Jak' o binz,* a celebrated political club in France which exercised great influence during the French Revolution. It was organized at Versailles as *Club Breton* upon the assembling of the States-General in 1789. From the first it was radical in tone, and included the most prominent leaders of the time. Upon the removal of the court and Assembly to Paris the membership and importance of the club rapidly increased. Since it met in a hall of the former Jacobin Convent in Paris, it came to be known as the Jacobin Club. Its influence spread over France through the organization of hundreds of branch societies. With the overthrow of the Girondists in 1793 the Jacobins became the practical rulers of France. The Convention itself was only their tool. Through Robespierre, their most influential member, they conducted the Reign of Terror. Upon his downfall in 1794 the club was closed. The name is still used to designate those who hold radical political views. See GIRONDISTS; FRENCH REVOLUTION.

Ja'cob's Lad'der, an early summer flower of the Polemonium Family. The species to which this name properly belongs is found only by rocky streams or in Northern marshes. It has a thick, horizontal root from which rises a smooth, leafy stem. The leaves are small, rounded leaflets opposite on the stem. The flowers have violet-colored, five-parted tubes and hang in long clusters. Greek valerian, to which the name Jacob's ladder is also applied, has spreading stems and lighter blue flowers. Valerian is used in medicine in nervous diseases. Many-flowered Solomon's seal and carrion flower are sometimes miscalled Jacob's ladder.

Jade, a species of hornblende, composed chiefly of alumina, magnesium, silica and calcium. It is tough and hard, of a glassy luster, translucent to opaque, and varies in color from dark green to white. Jade has been used for implements and ornaments by prehistoric peo-

ples of Mexico, Alaska and Switzerland; and it is today much used in the East, particularly in China and Japan, in making vases and ornaments.

Jaffa, *Jah' fah,* (ancient Joppa), a town of Palestine, 31 m. n.w. of Jerusalem, on a peninsula projecting into the Mediterranean. Its most important buildings are mosques, churches, a convent, numerous bazaars, several hospitals and some interesting hotels. There are many beautiful gardens within the city. It is a trade city and exports fruit, corn, wine, soap and wool. 'In the time of Solomon, Jaffa was the port of Jerusalem, and here were brought the cedars imported for use in the Temple. It was prominent in the Crusades and was taken by Napoleon in 1799. It is now connected with Jerusalem by railway. Population, between 20,000 and 40,000.

Jaguar, *Jag' wahr,* a large and rather ferocious member of the Cat Family found in South America in the regions of the Orinoco and the Amazon. It resembles the leopard in color, having a tawny or brown, furry coat dotted with groups of black markings, each having a central black spot. Its body and limbs are more bulky than those of the leopard, its head larger and more rounding and its tail shorter. The jaguar is such a powerful animal that it makes its prey of the largest of South American animals, as the tapir, manatee and crocodile. It rarely attacks man, although it has been known, when hungry, to follow and spring upon the solitary hunter. The fur of the jaguar is very valuable.

Jainism, *Jine' iz'm,* the name given to a religion of early India which arose as a protest against Brahmanism. The word comes from *jina,* meaning conqueror. The teachings of the Jainas are similar to those of the Buddhists in that they deny the divine origin and authority of the Vedas, and in their worship of certain saints. The Jainas believe in the institution of caste, but they repudiate all rites of the Brahmans which involve destruction of animal life. The "Three Gems" of the faith are right knowledge, right conception and right action. They revere numberless divine beings, assigning the highest rank to the deified saints called *Jina.* The Jainas are divided into religious and lay orders, the members of each class having particular duties to perform. Jainism has never spread beyond the limits of India, but it still retains a prominent position among the Hindu religions, claiming about 1,000,000 adherents.

Jal'ap, a twining, Mexican plant of the Honeysuckle Family, producing a medicinal drug. The plant grows from a tuberous root and twines by means of leaf tendrils. The leaves and flowers are much like those of the ordinary honeysuckle. The drug is procured from the roots, which are dug, cleaned and dried in nets over fire. Although the plant is native in Mexico, it thrives well in Jamaica and India. Tampico jalap is the root of an allied species also found in Mexico and recognized by its irregular and shrunken shape. It, too, is used medicinally.

Jamaica, *Ja ma' ka,* an island of the West Indies and the largest of the British possessions among the Greater Antilles. It lies in the Caribbean Sea, 570 m. n.e. of the Isthmus of Panama and 89 m. s. of Cuba. Its area is 4250 sq. m., or about the same as that of Connecticut. The central part is mountainous, and the highest range is the Blue Mountains, which approach the coast at the south and east. There are many excellent harbors, especially at the south, where the shore is deeply indented. The rivers are swift and, in general, not navigable. The soil is fertile, and vegetation is abundant in most regions, although there are areas where irrigation is necessary. The climate is tropical near the coast, but inland is mild and healthful, making many parts of the island attractive to tourists and to health seekers. The chief industry is agriculture. In the lowlands are vast sugar and coffee plantations, and everywhere fruits, tobacco and dyewoods are raised. On the mountain slopes great herds of cattle are pastured.

The executive authority of Jamaica is

a governor, who is aided by a privy council and by a legislative council. There are three provinces and 15 administrative parishes. Kingston, the capital, Spanish Town, Port Antonio, Port Royal, Savannah la Mar, Montego Bay and St. Ann's Bay are the chief cities. The people are whites, negroes and half-breeds, with a few Chinese and East Indians. Education is not compulsory, but there are good schools, a University College at Kingston and an excellent high school at Hope.

Jamaica was discovered by Columbus in 1494 and early became a Spanish possession. It was taken by the English in 1655 and became a part of the British Empire by the Treaty of Madrid in 1670. The emancipation of the negroes, who had been imported to work in the sugar plantations, took place in 1833. The island has been visited by many earthquakes, that of January, 1907, being especially severe. Population, 831,400.

James I (1566-1625), King of Great Britain and Ireland, and, as James VI, King of Scotland. He was the son of Mary Queen of Scots by her second husband, Lord Darnley, and became King of Scotland when his mother was deposed, the year after his birth. He was a feeble lad but was fortunately under the guardianship of wise regents until 1578. His training was along classical lines and led to his continued interest in literary affairs. During this period of his life he was detained at Stirling Castle, away from the uncertainties and confusion of the court, but from his 12th year he exerted a beneficial influence upon Scottish affairs. There he organized a strong, centralized government by reducing the power of the barons and strengthening the authority of the State over that of the Church. His first interest was in the advance of Scotland, and to it he gave his chief attention even after his accession to the English throne. This event occurred upon the death of Elizabeth in 1603, and in this part of his kingdom James was a less successful ruler. Early in his reign (1605) occurred the Gunpowder Plot, caused by the persecution of the Catholics (See GUNPOWDER PLOT). When the Thirty Years' War broke out in 1618, he formed an alliance with the French by marrying his son Charles to a French princess, and was finally led by this son to declare war against Spain. The colonization of the New World rapidly advanced during this period and was marked especially by the founding of Jamestown, named in honor of the King, and the further removal of the Pilgrims from Holland to the Plymouth Colony. James was a patron of literature and encouraged the literary tendencies that had been aroused in the age of Elizabeth. Under his patronage the King James, or "Authorized," translation of the Bible was prepared and published. He is the supposed hero of Scott's *Lady of the Lake*.

James II (1633-1701), second son of Charles I of England and himself King of England from 1685 to 1688. He, with his father, was kept in surveillance by Parliament until 1648, when he escaped to France and later to Spain, where he served in the national army. After the Restoration he returned to England and, as Duke of York, became lord high admiral; owing to his conversion to the Catholic faith, he was soon obliged by the Test Act to give up his office. Upon the death of his elder brother, Charles II (1685), he ascended the throne and began at once the advancement of the Catholic Church in his realm. Through various injustices James became so unpopular that in 1688 an invitation was sent to William of Orange, who had married James's daughter, Mary, to become King of England; and the King's tardy acts of conciliation failed to counteract public sentiment. His officers, with whole regiments, deserted to the cause of William, who landed at Torbay in November. James was forced to flee to France, where he spent the remainder of his life. The only son of James is known in history as James the Pretender.

James, Edmund Janes (1855-), an American educator and political economist, born at Jacksonville, Ill., and edu-

cated at Northwestern University, at Harvard and in Germany. After a brief service in the public high schools of Illinois, he held professorships in the universities of Pennsylvania and of Chicago, served three years as president of Northwestern University, and in 1904 succeeded Andrew S. Draper as president of the University of Illinois. He has served as president of the American Academy of Political and Social Science, and has exerted a wide influence upon educational methods and administration throughout the country. His writings include *The Legal Tender Decisions, The Federal Constitution of Germany* and *The Education of Business Men in Europe.*

James, Henry (1843-1916), an American novelist and essayist, born in New York City. His father was the eminent theologian Henry James, and his brother was William James, the psychologist. He was educated in New York, Switzerland, France and England; when he entered the Harvard Law School in 1862 he soon discovered that he preferred literature to law. In 1869 he revisited Europe, and since then has lived chiefly in Italy and England. His work is extremely subtle; his characters complex. He writes of the leisure class, rarely touching upon the drudgery of a workaday world, and is more concerned with the development of character than with dramatic incident. His style is pure and refined, though sometimes difficult; his themes are modern. He emphasizes the psychology of action with consummate skill, and his stories are masterly delineations of the subtle emotions of selected groups of society. Among his works are *Daisy Miller, French Poets and Novelists, The Portrait of a Lady, Portraits of Places, The Bostonians, Partial Portraits, The Awkward Age, The Wings of a Dove, The Golden Bowl* and *English Hours.*

James, William (1842-1910), an American psychologist, born in New York City and educated at Harvard and in Europe. He became an instructor at Harvard in 1872, and later held the professorships of philosophy and psychology. After 35 years of distinguished service, he was made professor emeritus in 1907. As a teacher and writer he won an international reputation in the field of analytical psychology. He was Gifford lecturer on natural religion at the University of Edinburgh in 1899-1901, and Hibbert lecturer on philosophy at Oxford in 1908. His works include *Human Immortality, Principles of Psychology* and *Talks to Teachers on Psychology.*

James, Epistle of, the first of the seven General Epistles of the New Testament, written by James the Less, brother or near relative of Christ, the first bishop of Jerusalem. This Epistle gives evidence of a decline in the religious fervor of the Christian Jews, to whom it is addressed. It reproves their hypocrisy, presumption, censorious spirit and love of riches, and emphasizes the fact that "faith without works is dead." As a whole, the Epistle is a practical and plain exposition of godly living. It was written about A. D. 61, near the close of the author's life.

James River. See DAKOTA RIVER.

James, Saint, called the Greater, one of the Twelve Apostles of Christ, the son of Zebedee and the brother of John, a fisherman on the Sea of Galilee. He was one of the first four disciples, and whenever a selection was made from the Twelve for any special purpose, James was one of the number. Of an energetic and enthusiastic temperament, he took a leading part in the management of the early Church and was the first of the apostles to suffer martyrdom, about A. D. 42.

Jamestown, N. Y., a city of Chautauqua Co., 70 m. s.w. of Buffalo and 25 m. from Lake Erie, on the Chadakoni River, the navigable outlet of Chautauqua Lake, and on the Erie, the Jamestown, Chautauqua & Lake Erie and other railroads. The city is a noted summer resort and is finely situated on rising hills, near the beautiful Chautauqua Lake, which is 18 m. long. Lake steamers and electric cars connect the

city with a number of the near-by towns and lake resorts. A popular attraction is Celoron, an amusement resort on the lake shore. Jamestown is the center of a productive agricultural and fruit-growing region. It also has important manufacturing interests, owing to its excellent water power and supply of natural gas, piped from Pennsylvania.

INSTITUTIONS. Among the institutions and public buildings are the Agnes Home for working girls, the Women's Christian Association Hospital, a high school and the James Prendergast Free Library, containing a large number of volumes.

INDUSTRIES. Jamestown early developed important manufacturing industries, and contains sawmills, canning factories, brickyards, flour mills, lounge factories and worsted mills. There are also extensive manufactories of washing machines, boots and shoes, furniture, stained glass, photographic paper, knit goods, voting machines, metallic goods, agricultural implements, brooms, shirts and textile fabrics.

HISTORY. Jamestown was settled in 1810 and incorporated as a village in 1827. A city charter was granted in 1886. Jamestown was named in honor of James Prendergast, an early settler. Population in 1920, U. S. census, 38,898.

Jamestown, Va., the first permanent English settlement in America, was founded under the auspices of the London Company by 105 adventurers under Captain Newport. About half of these men were "gentlemen," and a few were laborers and mechanics, and the rest were servants and soldiers. The expedition left England Dec. 19, 1606, and landed in the New World on May 13, 1607. The spot chosen was on the north side of the James River, 32 m. from its mouth, on a peninsula. See VIRGINIA, subhead *History*.

Janesville, Wis., a city and the county seat of Rock Co., 60 m. n.w. of Chicago, on the Rock River and on the Chicago & North Western, the Chicago, Milwaukee & St. Paul and other railroads. The city utilizes the water power of the river and has various manufacturing establishments, including foundries, wagon and carriage factories, cement works, brickyards, cotton and woolen mills, stockyards and manufactories of school supplies, fountain pens, furniture, flour, agricultural implements, boots and shoes. A large trade in farm and dairy products and manufactured products is carried on. Janesville is attractively situated on bluffs above the river. It is the seat of the Wisconsin State School for the Blind, and has a city hall, courthouse, post office, public library, city hospital and Y. M. C. A. Building. The place was settled about 1834 and was named in honor of Henry F. Janes, one of the first settlers. It was chartered as a city in 1853. Population in 1920, 18,293.

Jan'uary, the first month of the year, containing 31 days. This month, added to the calendar by the Roman Numa, was named after their god, Janus, the god of beginnings; and was considered the first of the year by the Romans after 251 B. C. January was adopted as the first month of the year in England by act of Parliament, 1751, and is now received as such by nearly all civilized nations. See YEAR; MONTH.

Ja'nus, a divinity of the ancient Latins, was porter of heaven and guardian of portals. He was represented with two heads, in order that he might guard both sides, since a door faces two ways. The feast of Janus opened the New Year, and the first month of the calendar, January, was named in his honor.

Japan', or **Nip'pon',** an island empire of Asia, made up of a crescent-shaped chain of islands stretching along the eastern coast and separated from the continent by the Sea of Japan, Formosa Strait, Gulf of Tartary and Kurile Strait. The empire is made up of: four large islands, Hondo, Shikoku, Kiushiu and Yezo; five smaller ones, Sado, Oki, Awaji, Iki and Tsushima; the Loo-choo group and the Bonin group; besides these there are the more recently added possessions, the Kurile group, Formosa, the Pescadores, the southern part of Sak-

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STREET SCENE IN YOKOHAMA

Light jinrikishas hauled by coolies take the place of cabs and carriages in Western cities. The coolies charge about 75 cents a day for their services.

JAPANESE CHILDREN ALSO HAVE THEIR FROLICS

THE PICTURESQUE COSTUMES AND SMILING FACES ADD INTEREST TO THIS SCENE IN A YOKOHAMA PARK

halin and the Peninsula of Korea. The insular area is 175,154 sq. m., and with Korea the total area of Japan is 259,574 sq. m., about the area of Texas. The name Japan is a corruption of a Chinese word meaning sun source, and refers to the fact that Japan lies east of China. From this, English-speaking people have learned to call this country the "Sunrise Kingdom," and the Japanese themselves have adopted the sun as their emblem.

Physical Features. The islands of "Old Japan" lie in practically the same latitude as the states of the Mississippi Valley, but the climate and topography of the islands are much more varied. A long mountain range forms the backbone of Hondo and culminates in the famous and beautiful Fujiyama (12,365 ft.). This mountain, like most of those of Japan, is volcanic, and though many are extinct, or at least dormant, eruptions are not infrequent. Scientific instruments record that rarely a day passes without an earthquake shock. Fortunately the most of these are imperceptible to the ordinary observer, although they make "skyscrapers" an impossibility. Hot mineral springs are abundant, and health resorts and summer resorts have sprung up about them in the same way as in the Western world. The level land, which is chiefly along the river courses or on the coasts, includes only about one-eighth of the country. There are a few lakes, and these are remarkable for their beauty. The rivers are short and swift and in general not navigable. In the spring they often become torrents, which by their floods work great destruction of life and property. The mountainous character of the coast line gives Japan many excellent bays and harbors. There are now nearly 30 open ports, and the growing commerce of the country demands the opening of more. The climate is ordinarily mild, although the northern islands have severe winters.

Industries. Japan is an agricultural country, but the farms are small. A farm of 12 acres is considered a large holding, while one of two acres is of the average size. The chief crops are rice, barley, wheat, millet, maize and garden vegetables. Fruits and nuts are abundantly grown, but the fruits are said to be of poor flavor. Tea, tobacco and mulberry trees are raised in the south, and the silk industry is the most important with respect to foreign trade. Recently, cotton weaving and, since the annexation of Formosa, the production of camphor, have proved profitable and growing industries. Fishing has always been carried on, but never to such an extent as at present, when modern craft and modern methods are taking the place of the old system of fishing by torchlight with cormorants. Mining, the manufacture of lacquered ware, engineering, the making of paper and glass, and poultry raising are other pursuits carried on extensively in various parts of the islands.

Travel and Commerce. Oxen are still used for the transportation of freight, but the horse car, the stage, the jinrikisha, the railroad, the bicycle, the electric railway and the automobile are all now to be seen. Of these, the jinrikisha is the only distinctively Oriental vehicle. It is a two-wheeled cart pulled by one or more fleet-footed coolies, who charge but about six cents per hour for their services.

People and Customs. The Japanese are of the Mongolian race and are of two distinct types: the aristocratic class may be recognized by their oval faces, narrow eyes and fine features; the peasant class, by their round expressionless faces, flat noses and full eyes. Both classes are ordinarily short of stature. Patriotism, generosity, hospitality, kindness and obedience are familiar national virtues, while intemperance and deception are the most common faults. There are three distinct classes, the nobility, the gentry and the peasants. The first class was created in 1884; the second consists of the descendants of the knights; and all others belong to the third class.

Japanese buildings are unique structures, made to be insensible to the frequent earthquakes. They are scantily

furnished, simplicity being the keynote of all their decorations. The partitions of the rooms and even the outer walls slide in grooves in such a way that all may be thrown into an open, large room, and that, too, opened to the outside air. The floors are inlaid with matting, which necessitates the removal of shoes before entering a house. Chess, cards, baseball, tennis, wrestling and the theater are the favorites diversions.

RELIGION. Japan is a country of many religious sects, but the basic principle of all of these is the relation of the ruler and the ruled. Unlike the Chinese, they place this loyalty above filial piety, and it is fundamental in the social and religious views of all Japan. Because of this the Japanese are intensely patriotic. Throughout their philosophy is a thread of fatalism which colors all their teaching and accounts for the simple, unassuming courage and the self-control with which the Japanese meets every situation. Buddhism was brought in from Korea in the sixth century (See BUDDHISM) and immediately obtained a wide following, although, owing to the philosophical trend of thought in the country, it soon split into numerous sects and subsects, 35 of which still exist. Christianity was introduced in 1549, and all modern religions of Japan show its influence. All sects have adopted faith healing, but hesitate to accept Christianity fully because of its monotheistic teachings. The number of Christians is, however, rapidly growing, and missions and mission schools are no longer looked upon with scorn.

LITERATURE. The ancient literature of Japan was written partly in Japanese, but chiefly in Chinese. It consisted of history, law, romance, drama, mythology, philosophy and poetry. The prose is almost all written in Chinese; thus Japanese literature is really a literature of poetry, and the people are said to be a nation of poets. The poetry, however, is without rhyme or alliteration, but has a quaintness of expression and a simplicity which is very appealing. Its most marked quality is its lyricism. The theater has flourished in Japan since earliest times. The drama originated as in other countries in songs, dances and orchestral performances which were religious in character. The modern drama appeared about three centuries ago, and tragedy, in which pathos and strength are frequently commingled, is the favorite form of play.

HISTORY. Japan is indeed an ancient empire, and the present dynasty is said to have been in power for 18 or 20 centuries. The first really authentic history of Japan begins at about the time when the Saxons were settling England. The country was then an absolute monarchy and Buddhism was just being introduced. During the long years leading up to the birth of New Japan, the country passed through its period of superstition, of civil strife, of literary development, of the rise of feudal nobility and of seclusion.

New Japan may be said to have arisen in 1853 when Commodore Perry visited Japan, and, as a result of the visit, negotiated in 1854 the treaty by which Japanese ports were opened to foreign commerce. With remarkable quickness the people adopted Western civilization, and an era of intellectual and commercial progress followed. A Parliament was established in 1889. Japan's military and naval strength was tested in 1894-5 in a victorious war with China, by which Japan acquired Formosa and the Pescadores, and ten years later troubles in Manchuria led to a greater conflict with Russia. In this later war Japan won a series of brilliant victories and forced Russia to leave Manchuria, to give up Port Arthur and one-half of Sakhalin and to give Japan free rein in Korea.

GOVERNMENT. The Emperor of Japan is the sole executive, although he rules under the advice of a cabinet whose members he appoints. There is also a Privy Council, whose duties are only advisory. The emperor may declare or conclude a war and make treaties. The Imperial Diet is made up of two houses, a House of Peers and a House of Rep-

resentatives. The first is composed of the male members of the imperial family who are of age, certain members of the nobility and persons nominated by the emperor because of meritorious services. The House of Representatives consists of 379 members elected from fixed electoral districts. The islands are divided for local government into prefectures, counties, municipalities and towns. Korea and some other of the dependencies have a local governor-general.

Japan has ten cities with a population of over 100,000. Chief among these are Tokyo, the capital; Osaka, Kyoto, Yokohama, Nagoya and Kobe. Population, 76,684,558.

Japan Current. See KURO SIWO, *Koo' ro She' wo.*

Japan'ning, the art of coating with varnish and painting certain articles in order to give them a glossy surface, and in imitation of Japanese lacquering. It is applied to articles made of metal, leather, wood and papier-mâché. When the varnish is baked on to metal articles, it is generally termed enameling. See ENAMEL; VARNISH.

Japan Sea, the large sea lying between Japan and the mainland of Asia. The Gulf of Tartary connects it with the Sea of Okhotsk on the north, and the Gulf of Korea with the East China Sea upon the south. In general, it is shallow, but near the Korean coast it reaches a depth of 10,000 ft. It receives no large river, and Vladivostok is its chief port.

Japurá, *Zhah" poo rah',* **River.** See YAPURÁ RIVER.

Jasmine, *Jas' min,* or **Jessamine,** *Jes' a min,* ornamental plants of the Olive Family brought from Oriental gardens. They are mostly twining or climbing shrubs, though some species have erect stems which grow to a height of from 6 to 12 ft. The evergreen leaves are borne in little leaflets along a midrib. The flowers of the common jasmine are white, but a few species have yellow blossoms. In all, the flowers hang in terminal clusters and are very fragrant. Each separate flower has a corolla of from five to eight parts, within the tube of which are two stamens. The fruit is an irregular, two-lobed berry. The jasmine furnishes oil of jasmine, a sweet perfume. This oil is prepared by placing jasmine flowers between layers of cotton soaked in oil of ben, not by distillation. In the South, where the jasmine flowers abundantly, the blossoms are much used in flower festivals, and in the East it is still woven into the bridal wreath as a symbol of affection.

Ja'son, in Greek mythology, King of Iolcus in Thessaly, leader of the Argonauts. He married the sorceress, Medea, who not only had helped him to get the ram's fleece, but who restored to youth his infirm father, Æson, and destroyed his usurping uncle, Pelias. Driven from their kingdom by the son of Pelias, they lived happily in Corinth for ten years. Then Jason put Medea aside for Creusa, a Corinthian princess. One account says that when the Argo was tumbling to pieces from decay, Medea contrived to have Jason sleep under the prow, which fell on him and caused his death.

Jas'per, an impure, opaque variety of quartz, not so hard as flint, but producing fire when struck with steel. It admits of a high polish, and exhibits a great variety of colors, usually red, brown, yellow or green, due to the impurities present. It occurs in metamorphic rocks, frequently in great masses. When the formation is in layers with chalcedony, it is called agate jasper; when coloration is in layers, it gives the name ribbon jasper. The brown and yellow varieties are known as Egyptian jasper. Jasper was used by the ancients for ornamental purposes. At the present time jasper is used for vases, rings, seals and sometimes for mantels and table tops, and the coarser grades form excellent building stone.

Jaundice, *Jahn' dis,* or **Icterus,** *Ik' ter us,* an abnormal bodily condition due to an excess of bile in the blood. It is marked by a yellowish color of the skin and eyes, general weakness, constipation and lassitude. It is caused by

a diseased condition of the liver or an obstruction of the bile duct. The bile in either case, instead of emptying into the intestine, accumulates in the blood. Malignant attacks are often fatal. See LIVER.

Java, *Jah' va,* the third largest island of the Sunda group in the East Indian Archipelago. It lies south of Borneo and southeast of Sumatra, being separated from these islands by the Java Sea. Its area, 50,554 sq. m., is about the same as that of the State of New York. The interior of the island is broken by many volcanic peaks, whose frequent eruptions in the past have made a deep, rich soil of lava. About the coast, especially at the north, the surface is low, flat and swampy. The climate is generally healthful, especially in the highlands where the temperature is even and the seasons are all pleasant.

Java was formerly best known for its coffee, but now rice is by far the greatest crop. Where irrigation is successfully practiced, three crops are harvested annually. Sugar, tobacco, tea, indigo, pepper, cinchona and cloves are also important products. The people of Java are members of the Malay race; they are of a high stage of civilization and have a well-developed literature. Batavia, the capital, Buitenzorg, Jokyokarta and Samarang are the chief cities. Java is a possession of Netherlands, and for purposes of government is divided into 22 residences, or provinces, under the control of a governor-general. The native population is about 31,000,000, and there are about 60,000 Chinese and Europeans.

Java Sparrow, Ricebird or **Paddy Bird,** a bird of the Finch Family, about the size of the English sparrow, gray in color, with black tail, white patches on the cheek, and rose-colored bill. The nest is large and round, and is made of grass, with an opening on the side. It is usually built in bushes or in bunches of grass, but some birds build about houses. The eggs number six or more and are pure white. Its native home is in Java, Malacca and Sumatra, but it has been carried to many other countries. It is considered one of the best of cage birds, and in captivity is familiar to many. In the winter months these birds associate in large flocks and are very destructive to rice plantations.

Javelin, *Jav' lin,* a short, light spear, usually thrown. It was used in ancient warfare by both foot soldiers and horsemen. The Romans used this weapon both to thrust, as with a sword, and to throw. It consisted of a shaft, or handle, over four feet long, and a barbed iron head, which fitted over the handle nearly half its length. The whole weapon was about seven feet long. The javelin was in use before the time of the Romans and also among other peoples, notably the Goths.

Jay, a bird of the Crow Family. The blue jay of eastern America is so well known that it needs no introduction. Its bright blue back, white-tipped tail feathers, whitish under parts, black neck and shoulder mark and raised crest, together with its harsh "jay, jay," will readily distinguish it. Though handsome of feather, its disposition to rob birds' nests and eat the eggs and young has given it a bad reputation. The one redeeming trait of this bird is its fondness for burying nuts, acorns and other seed in the ground, by which means many fine trees have been planted. As a pet, the jay is amusing because of its many tricks. The bulky and loosely-built nest is made of grass and is placed in any kind of a tree or bush, from 5 to 40 ft. above the ground. Three to six blue eggs with brown spots are laid. The young are naked when hatched, acquire pin feathers and open their eyes in nine days, and are feathered out and leave the nest in 16 days.

Jay, John (1745-1829), a Revolutionary patriot and statesman, first chief justice of the United States, born in New York City, of Huguenot descent. He graduated at King's College (now Columbia) in 1764 and was admitted to the bar in 1768. He was a delegate to both the First and the Second Continental Congress in 1774 and 1775, and

was a member of the New York Committee of Correspondence, of the Committee of 100 and of the secret Committee of Protection. In 1776 he attended the New York convention which adopted the state constitution, which he drafted, and the next year he became the first chief justice of the new state. He was sent as minister to Spain in 1779 to secure assistance from that nation, and in 1783 was associated with Franklin and John Adams at Paris in negotiating peace with England, being chiefly instrumental in securing the very favorable terms of the treaty.

Jay was secretary of foreign affairs from 1784 to 1789, was a leading advocate of the new Federal Constitution, and helped to secure its ratification in the New York convention. He joined with Hamilton and Madison in writing *The Federalist.* When the new government was organized in 1789, he became the first chief justice of the United States. In 1794 he was envoy-extraordinary to Great Britain, where he negotiated the Jay Treaty, which was exceedingly unpopular in the United States. Upon his return to America he declined reappointment as chief justice, but served as governor of New York from 1795 to 1801, when he retired to his estate of 800 acres at Bedford, near New York City, where he spent his time largely in reading and writing.

As a jurist, statesman and diplomat Jay ranks among the leaders of American history, while the justice and purity of his personal character command the highest respect.

Jay Treaty, a treaty negotiated in 1794 by John Jay, who was sent as special envoy to England, and Lord Grenville, representing the United States and Great Britain respectively. It provided for the evacuation of the forts in the Northwest by the British, and for a commission to settle the boundary between Canada and the United States and the question of indemnity to the United States for capture of American merchantmen after the Revolutionary War. It also placed restrictions on American trade with the West Indies. The treaty was exceedingly unpopular in the United States, and its ratification was finally made a party issue.

Jeannette, *Je net',* **Pa.,** a city of Westmoreland Co., 4 m. n.w. of Greensburg and 27 m. s.e. of Pittsburgh, on the Pennsylvania Railroad. The borough is supplied with natural gas. It has manufactories of window and flint glass, mine fans, lamps and shades, electric carbons, rubber goods, etc. Coal and iron are found in the vicinity. Population in 1910, 8077. In 1920, 10,627.

Jef'ferson, Joseph (1829-1905), an American actor, born in Philadelphia, Pa. He came from a family of actors, and began his stage career in the play *Pizarro,* when only three years old. When four years of age, he was dancing as a miniature "Jim Crow." The rôles in which he made himself famous were Caleb Plummer in *The Cricket on the Hearth,* Rip Van Winkle, and Bob Acres in *The Rivals.* During the latter part of his life, Jefferson confined himself principally to these three famous rôles, which he played in a masterly way and with unflagging popularity. Jefferson was a man of interesting personality and high character.

Jefferson, Thomas (1743-1826), an eminent patriot and statesman, third president of the United States, born in Shadwell, Va., and educated at William and Mary College. He was admitted to the bar in 1767, and immediately secured a successful practice. His public career began in 1769, when he was elected to the Virginia House of Burgesses, where he served until the Revolutionary War began. He attended the Virginia convention called in 1775 to consider the crisis, was made a member of the committee appointed to arrange a plan for arming the colony, and was a member of the Second Continental Congress, which met later in the same year. In the following June he was appointed chairman of a committee of five to prepare a Declaration of Independence, the original draft of which he wrote.

Jefferson then resigned his seat in

Congress, and devoted the next two years to his private interests and to public affairs in Virginia, where he had been elected to the Legislature. He gave particular attention to working out a governmental and judicial system for the state, a task in which he rendered inestimable service. From 1779 to 1781 he was governor of the state. He was appointed one of the commissioners to negotiate peace with England in 1783, but before he sailed news came that the treaty was practically agreed upon, and he remained at home, entering Congress in the fall, where he was influential in securing the adoption of the decimal system in our national currency. In 1784 he was appointed by Congress to serve with Franklin and John Adams to arrange commercial treaties with foreign nations, and sailed for Paris in July. A year later he succeeded Franklin as minister to France, where he remained until 1789.

When Washington organized the first cabinet of the new nation, he appointed Jefferson secretary of state. He served in this capacity until Jan. 1, 1794, when he resigned because of differences between him and Hamilton, the two representing respectively the Democratic and Federalist tendencies that were crystallizing into parties. Retiring to Monticello with the thought that his public work was ended, he nevertheless permitted his name to be used for the presidency in 1796, but was defeated by John Adams. Four years later, however, he was elected to succeed Adams, and was reelected for a second term in 1804. During his administration the Barbary pirates were surpressed, the vast territory west of the Mississippi known as Louisiana was purchased from Napoleon (1803), and democratic customs were introduced into the White House and into the conduct of governmental affairs.

In 1809, after 40 years of almost continuous service, Jefferson retired to private life at Monticello. The neglect of his property and the large drain upon it brought him into serious financial embarrassment, which, however, was partially relieved by the sale of his library to Congress and by generous voluntary subscriptions made to him by New York, Philadelphia and Baltimore. During his closing years he gave much attention to the public school system of Virginia, and especially to the state university, the organization and construction of which he personally supervised. He died, by a happy coincidence, on the 50th anniversary of the signing of the Declaration of Independence, July 4, 1826; John Adams also passed away a few hours later on the same day.

Jefferson easily ranks among the foremost of that remarkable group of men who, at the beginning of our national life, were instrumental in shaping the course of events and in formulating our governmental theory and system.

Jefferson City, Mo., the capital of the state and the county seat of Cole Co., 125 m. w. of St. Louis, on the Missouri River, here spanned by a steel bridge, and on the Missouri Pacific, the Chicago & Alton, the Missouri, Kansas & Texas and other railroads. Jefferson City is built on elevated ground above the river. The town is an important trade and manufacturing center. The principal factory products are shoes, clothing, flour, beer, cigars, carriages, wagons, brooms, brick, tile, agricultural implements, binding twine and saddletrees; and there are in the town roundhouses, railroad shops and foundries. Among the important institutions are Jefferson City College and Lincoln Institute, the latter a state school for negroes. The institute has normal, college, agricultural and industrial courses. There are two large libraries in the city—the state law library, one of the finest of its kind in the country, and a Carnegie library. The state penitentiary, located here, is to a large extent self-supporting, convict labor being employed on the penitentiary premises by incorporated companies. Among the principal structures of the city are the Missouri State Capitol, the state armory, the Supreme Court Building, the United States Courthouse, the post office

and the executive mansion. Jefferson City, named in honor of Thomas Jefferson, was laid out in 1822. The capitol building was burned in 1911, and a $3,500,000 structure has been erected on the enlarged site. The Legislature first met here in 1826, and in 1828 the place became the county seat, receiving its city charter 11 years later. Population in 1920, U. S. census, 14,067.

Jeffersonville, Ind., a city and county seat of Clark Co., 5 m. above New Albany and 108 m. s. of Indianapolis, on the Ohio River at the head of the Ohio Falls, and on the Baltimore & Ohio Southwestern, the Pennsylvania, the Cleveland, Cincinnati, Chicago & St. Louis and other railroads. It is opposite Louisville, Ky., with which it is connected by two substantial railroad bridges. It contains extensive passenger- and freight-car works, river-steamboat yards, iron foundries, machine shops, chain and hollowware works and other industrial works. A United States quartermaster's supply depot, the Indiana State Reformatory and an orphans' home are located here. Population in 1920, U. S. census, 10,098.

Jeffreys, *Jef' riz,* **George,** Lord (1648-1689), an English judge. Early recorder of London, he later became a Welsh judge, chief justice of Chester and chief justice of England. Meanwhile, in 1680, he was created a baronet. He was responsible for the arbitrary proceedings of James II, and in 1685 was made lord high chancellor for his infamous work in the "bloody assizes," persecuting those who had contributed to Monmouth's rebellion. Though applauded at court, Jeffreys inspired unspeakable hatred in western England. On the arrival of William of Orange, he attempted flight, was apprehended and died in the Tower.

Je'hu, a King of Israel and founder of the fourth dynasty of the Kingdom of Israel. His reign extended from 842 to 816 B. C. While a commander in the army of King Jehoram, he was consecrated king by one of the "children of the prophets," who was sent by Elisha. After attacking and slaying Jehoram, Jehu entered upon the work of destroying the house of Ahab, among the objects of his vengeance being Jezebel, and Ahaziah, King of Judah.

Jel'lyfish", a name given to many of the lower forms of animal life, whose bodies are of jellylike consistency. The majority belong to a class of Cœlenterata and are often found on the beach at low tide; if placed in water they unfold in umbrellalike forms, fringed with long, thready tentacles. Many of the tentacles have great stinging power, but are of little use as motor organs. Locomotion is accomplished by a rapid expansion and contraction of the disk. Reproduction is by eggs, but the young pass through a curious transformation and do not resemble the parents. The generation produced from these offspring, however, do resemble the original stock; thus true jellyfish are produced only every second generation.

Jenks, Jeremiah Whipple (1856-), American writer and teacher, born at St. Clair, Mich., and educated at the University of Michigan and in Germany. He taught in Mt. Morris College, Knox College, University of Indiana and Cornell University, where he was professor of political economy and politics. He was the expert agent of the United States Industrial Commission to investigate trusts in the United States and Europe. In connection with the department of labor he made several trips to Europe and the East in the study of special questions. In 1912 he accepted the appointment of financial adviser of the Chinese Government. He is a frequent contributor to periodicals.

Jenny June. See Croly, Jane Cunningham.

Jephthah, *Jef' thah,* one of the wisest judges of Israel, whose history is found in *Judges xi-xii.* He is chiefly remembered because of his vow, made before starting upon a campaign against the Ammonites, to sacrifice to Jehovah the first living thing which met him at his return. His daughter, learning of his victory, came to meet him and was, in consequence, sacrificed.

Jerbo'a, an African and Asiatic Rodent sometimes classed in a family by itself, the Jerboa Family, and sometimes placed in the Rat Family. It is a tiny animal, rarely exceeding seven inches in length and often not more than three inches. It has a ratlike face except for the nose, which is somewhat shortened and wrinkled. The tail is long and tufted and is used as a balance as the jerboa skips along upon his hind legs. The animal is particularly fitted for this method of locomotion by having the two bones of the lower leg united into one. Jerboas live in elaborately constructed tunnels, where a whole community helps to store grain and, later, to consume it.

Jer"emi'ah, one of the prophetic books of the Old Testament; also the name of the second of the great Hebrew prophets, the author of the book of *Jeremiah.* Jeremiah was the son of Hilkiah, a priest of Anathoth. Beginning his prophecies in the 30th year of the reign of Josiah, he lived to see the city of Jerusalem captured and destroyed by the Babylonians and his countrymen carried away captive. The remnant who gathered about him, disobeying the divine command, carried him away to Egypt, where he was put to death. Jeremiah was a contemporary of Zephaniah, Habakkuk, Ezekiel and Daniel. His prophecies consisted of: (1) warnings to the Jews; (2) survey of all nations, with an historical appendix; (3) prediction of the better days to come, with a similar appendix; (4) prophecies regarding Egypt. *Lamentations* and some of the *Psalms* were also written by Jeremiah. See BIBLE, subhead *The Old Testament.*

Jeremiah, Lam"enta'tions of. See LAMENTATIONS.

Jericho, *Jer' i ko,* an ancient city of the Canaanites, in the Valley of the Jordan, situated about 15 m. n.e. of Jerusalem. It was captured and destroyed by the Israelites under the leadership of Joshua, after they had crossed the Jordan on their way to the Promised Land. This city was of strategic importance because it gave access to the interior of the country, and Joshua pronounced a curse on whoever should rebuild it as a fortified city. It was, however, rebuilt in the time of Ahab. Jericho had wealth and importance in the time of our Lord. The small village of Eriha now occupies its site.

Jericho Rose. See ROSE OF JERICHO.

Jer"obo'am, the name of two kings of Israel. Jeroboam I, son of Nebat, was the founder of the Kingdom of Israel in its separate and independent existence. He rose to distinction in the reign of Solomon, when he began to sow the seeds of a rebellion which culminated at the time of the death of Solomon, about 937 B. C. Jeroboam became ruler over ten tribes, who formed the northern kingdom, known as Israel. The other two tribes comprised the Kingdom of Judah. Jeroboam II was the son and successor of Joash and the last member but one of the fourth Israelitish dynasty. He reigned about 782-741 B. C., during which time Amos and Hosea prophesied.

Jerome', Jerome Klapka (1859-), an English humorist, born in Walsall, Staffordshire. He was educated at the Philological School, Marylebone, served as clerk in a railroad office, and became in turn actor, journalist, teacher, shorthand writer and lawyer's clerk. From 1892 to 1897 he was engaged in editorial work. His experiences on the stage were recorded in *On the Stage—and Off* and *Stage Land.* He produced good comedies and farces, including *Barbara, Sunset, Wood Barrow Farm, New Lamps for Old, MacHaggis* and *Miss Hobbs.* His most humorous work is *Three Men in a Boat.* Other clever and successful productions are *Idle Thoughts of an Idle Fellow, Novel Notes, Diary of a Pilgrimage, Sketches in Lavendar, Observations of Henry, American Wives and Others* and *Tommy & Co.*

Jerome of Prague (about 1360-1416), a famous Bohemian, the companion of John Huss. He attended the university of his native town and later studied at Paris, Cologne, Oxford and Heidelberg. With Huss, he crusaded against

the abuses of the hierarchy and the profligacy of the clergy, and when Huss was arrested at Constance, he hastened to his defense. However, he was arrested on the way and conveyed to Constance, where, after months of imprisonment, he recanted. Subsequently he retracted his recantation, and for vindicating the principles of Huss and Wiclif, went to the stake.

Jerome, Saint (about 340-420), one of the most learned Fathers of the Catholic Church. He immortalized himself by translating the Bible from the original Hebrew and Greek into the Latin version now known as the Vulgate (See VULGATE). He also distinguished himself by his organization and direction of the first holy women who entered the monasteries in Rome.

Jersey, *Jur' zy,* **City, N. J.,** second largest city of the state and county seat of Hudson Co., on a peninsula between the Hudson River and New York Bay on one side, and Newark Bay and the Hackensack River on the other. The city occupies about 12 m. of Hudson River frontage opposite the lower portion of New York. The Pennsylvania, the Erie, the Lehigh Valley, the West Shore, the Central of New Jersey, the Delaware, Lackawanna & Western, the New York, Susquehanna & Western and the Baltimore & Ohio railroads have terminals here, and the city has extensive piers of various lines of coast and trans-Atlantic steamers. There are tunnels under the river to 33rd Street and Sixth Avenue and to Dey Street, New York City. Several ferry lines are in operation to different portions of New York. A number of interurban lines also extend to Newark, the Oranges, Paterson, Passaic and other neighboring towns and cities. Bergen Hill, an extension of the Palisades, extends through the city from north to south. The beautiful Hudson County Boulevard, about 19 m. long and 100 ft. wide, on the crest of the hill, passes through West Side Park, the handsome county park, which contains lakes and a large playground. The east side of the city is given over to manufacturing and shipping, while the avenues on the hill section are notable for many beautiful residences. It is an important commercial center, but is included in the port of New York.

BUILDINGS AND INSTITUTIONS. The noteworthy public buildings include the city hall, courthouse, People's Palace, armory, a public library containing over 100,000 volumes, and the historical museum. Among the educational institutions are the Hasbrouck Institute, German American School, St. Aloysius Academy (Catholic) and St. Peter's College (Catholic). The city has an excellent system of public schools. There are various hospitals and benevolent institutions.

HISTORY. The site where Jersey City now stands was formerly called Paulus Hook. In 1633 the first buildings were erected, and for more than a century a small agricultural and trading community occupied the Hook. Direct ferry connection began with New York in 1764, and in 1820 the town was incorporated as the City of Jersey. The name was changed to Jersey City in 1838. The towns of Bergen and Hudson City were annexed in 1870, and the town of Greenville was annexed three years later. The city entered upon the commission form of government in April, 1913. Population in 1920, U. S. census, 297,864.

Jersey, Island of, the largest of the Channel Islands, lying 15 m. w. of France and belonging to Great Britain. The coasts are rocky, having but one notable inlet, St. Aubin's Bay, but the interior is fertile and dotted with well-kept orchards and charming villages. The climate is mild; orchard and dairy products are the chief exports, this island having given its name to the famous Jersey cattle. The fisheries are also important. Jersey has its own legislative body and courts, and its chief executive is the lieutenant-governor. The principal towns are St. Aubin and St. Hélier. The island is the scene of Sir Gilbert Parker's *The Battle of the Strong.*

Jeru"salem. The chief city of Palestine, capital of the Jewish state there established at the close of the World War. It occupies a plateau about 2500 ft. above the Mediterranean and 3800 ft. above the Dea Sea. On the east the Valley of the Kedron separates this plateau from the Mount of Olives, and on the west and south is the Valley of Hinnom, which joins the Valley of Kedron on the southeast. A ravine, known as the Tyropœon Valley, enters the plateau from the south. Zion, the most celebrated summit, rises above the Valley of Hinnom to a height of 300 ft. Mt. Moriah is on the east and to the north is Mt. Bezeth. The Tyropœon Valley and many of the smaller depressions have been filled with debris, and it is impossible to obtain a correct idea of the surface of the plateau as it was at the time of Jerusalem's greatest prosperity.

Jerusalem is one of the most ancient, as well as one of the most interesting, of cities. At the conquest of the country by the Israelites the lower part of the plateau was taken, but the upper part remained in possession of the Jebusites until the reign of David. He captured the fortress on Mt. Moriah, made Jerusalem his capital and called it the "City of David." The city attained its widest celebrity under Solomon, who built the Temple, and a palace which was one of the wonders of the age. With the division of the kingdom, after Solomon's death, Jerusalem lost much of its prestige, though it still remained the religious and secular capital of Judah. During the reign of Hezekiah, Judah became tributary to the Assyrians. In 586 B. C. Nebuchadnezzar captured and destroyed the city and carried away many of the inhabitants as captives to Babylon. In 515 B. C. the Jews were allowed to return and the Temple was rebuilt, but on a scale far inferior to the structure reared by Solomon. The walls were rebuilt in 255 B. C. by Nehemiah. Following their construction a considerable number of the Jews returned to the city.

In 332 B. C. Jerusalem was captured by Alexander the Great, but was not materially damaged. By 168 B. C. the city had again become prosperous, but in that year it was sacked by the Syrians under Antiochus and the walls were thrown down. Under the Maccabees the city, together with Judea, became again independent, 165 B. C. A hundred years later all this region became tributary to Rome. Herod the Great rebuilt the Temple on a magnificent scale. He also constructed to the north of the Temple, the Fortress of Antonia, and on the western hill his celebrated palace. Herod Agrippa began a third, or outer, wall, which was planned on an extensive scale, but the Roman Government prevented its completion. Under Roman rule the city regained something of its former magnificence, which it retained until 66 A. D., when the revolt of the Jews, who intrenched themselves within the city, led to its capture by Titus in 70, after one of the most prolonged and terrible sieges the world has ever known. At this time the Temple was destroyed and never rebuilt. In 130 the city was rebuilt by Hadrian. Under Constantine the Great, Jerusalem became a distinguished Christian city. Constantine built the first Church of the Holy Sepulcher, supposed to be on the site of the tomb in which Christ was buried. In 636 the city was captured by the Mohammedans under the Caliph Omar. In 1099 Jerusalem was taken by the Crusaders and remained in possession of the Christians until 1187, when it was retaken by the Mohammedans under Saladin (See CRUSADES). Later the city was rebuilt by Solyman the Magnificent.

Modern Jerusalem is surrounded by walls from 25 to 50 ft. high and is entered through eight gates. The streets are narrow, crooked and in a bad state of repair. The buildings of interest are the Dome of the Rock, a mosque erected on the site of the Temple. The building has eight sides, each 68 ft. long, and is covered with porcelain of a variety of colors. The Church of the Holy Sepulcher, the Tower of David and a

mosque, known as the Tomb of David, and Via Dolorosa, or Way of Sorrows, are also of interest. Jerusalem is reached by railway from Jaffa, its seaport on the Mediterranean. The population is about 60,000, two-thirds of whom are Jews; and the other third is about equally divided between Mohammedans and Christians. The beginning of a new age in the history of Jerusalem was signalled by the overthrow of Turkey in the World War, and consequent release of many of her misgoverned provinces. Jerusalem was occupied by British troops under General Allenby, in December, 1917. This brought the Zionist movement to a triumphant conclusion. Jerusalem, as the capital of a Jewish state in which enlightened government prevails may become once more a center of world influence; in a way, renewing the cycle of history begun under David, 3,000 years ago.

Jes'ter or **Court Fool,** a clownish person, or buffoon, supported by a wealthy European noble or king in early times to make sport for friends and guests. Several won great reputations and a permanent place in history. The professional jester usually wore a garb of motley colors, and a cap, or cowl, of some vivid hue, adorned perhaps with a cock's comb or with asses' ears, and with bells.

Jesuits, *Jez' u its,* or **Society of Jesus,** one of the most celebrated of the Roman Catholic religious orders, founded by Ignatius Loyola. It was approved by Pope Paul III in 1540. The general aim of the society is the greater glory of God, the defense of Catholic truth against heresy, and its propagation in pagan lands. Its members are bound by the usual vows of poverty, chastity and obedience to superiors. Many add a fourth vow of obedience to the pope. The supreme authority of the organization is vested in a general, elected for life and subject only to the pope.

The early growth of the society was phenomenal. It rapidly spread over Europe and was most successful in its activities against the growing power of Protestantism. From their foundation, the Jesuits have in most countries been the foremost Catholic educators. Wherever they went they established colleges and carried out, on a large scale, improvements in the systems of education. This influence of the society reached its climax in the middle of the 18th century, when there were 728 colleges with about 300,000 students. The order is also one of the most zealous of all missionary bodies of the Church. Its missionaries have done wonderful work in the conversion, civilization and exploration of India, Japan, China and North and South America.

Toward the end of the 18th century close adherence to the pope made the position of the Jesuits insecure in many countries. In 1764 the society was suppressed by France, whose example was soon followed by other Bourbon courts of Europe. In 1773, actuated solely by the motive of "the peace of the Church," Pope Clement XIV suppressed the society in all the states of Christendom; but in 1814 the order was reestablished. Since then the Society of Jesus has flourished in all parts of the world. See LOYOLA, SAINT IGNATIUS OF.

Jesus Christ, the founder of Christianity. The personal name Jesus is the same as the Hebrew Jehoshua, Joshua or Jeshua, and means "Jehova is salvation." The word *Christ,* the Greek equivalent for the Hebrew word *Messiah,* is a title added later, meaning "the Anointed." The full name, therefore, would be Jesus, the Christ, or Jesus, the Messiah. The sources of our knowledge concerning the life of Jesus are mainly the four Gospels of the New Testament, together with incidental references in the Epistles. See GOSPELS, THE.

Jesus was born of Jewish ancestry, of the royal line of David, and he delivered his message first of all to the Jews. His life thus has Judaism for its background and some understanding of the latter is important (See JUDAISM). The Jews were at this time subject to Rome and were ruled by a Roman king or governor. For a people whose patriotism was a part of their religion, this

was an exceedingly irksome situation; and in the midst of their loss of independence their prophetic hopes of the coming of the Messiah, who should reestablish the nation along the lines of the Davidic Kingdom, had become very ardent. For his appearing they were ever on the watch.

There were many parties among the people. The most popular of these were the Pharisees, the religious party, whose activities took the form of trivial and external observances of the Hebrew law. Belonging chiefly to their number were the scribes, who had charge of the official religious life centering in the synagogues and schools. The most serious rivals of the Pharisees were the Sadducees, composed largely of the priestly nobility, and in alliance with the existing government. Among the minor parties, the Herodians were committed to the political interests of the Herod family; the Zealots were the political firebrands of the Pharisees' right wing; and the Essenes were strict separatists in politics and religion. These parties created an atmosphere keenly alive to the issues of the day. See PHARISEES; SCRIBE; SADDUCEES.

EARLY LIFE OF JESUS. These were the conditions into which Jesus was born about the year 5 B. C., shortly before the death of Herod the Great, King of Judea. The Christian Era and reckoning of time date from his birth; but when the calendar was established in 556 an error was made which put the point of beginning about five years too late. The mother of Jesus was Mary, and her husband was Joseph, a carpenter of Nazareth, in Galilee. The child was born in Bethlehem of Judea, the native town of Joseph and Mary. The stories connected with his birth alarmed Herod, who sought the child's life, and the family fled to Egypt, where they remained until the King's death. They then returned to their home in Nazareth, where the childhood, youth and early manhood of Jesus were passed.

Of this entire 30 years we have only the most meager information (*Luke ii, 40-52*). From this brief account we naturally infer that he lived with his parents, amid the same influences and subject to the same training as other Jewish boys. We learn also that at the age of 12 years he accompanied Joseph and Mary in their pilgrimage to Jerusalem to participate in one of the customary religious feasts. Some other things we know by inference. He was well versed in the Old Testament Scriptures. All Jewish children began the study of these at an early age. How thoroughly they influenced his thinking and life is also apparent from his teachings. These teachings likewise reveal an appreciative knowledge of nature and of men.

OPENING OF HIS PUBLIC MINISTRY —IN JUDEA. About the year 26 A. D. John the Baptist appeared in Judea declaring that the kingdom of heaven was at hand and that one mightier than he was coming to establish it. Jesus himself, now ready to begin his public ministry, was baptized by John in the River Jordan and was pointed out by him as the expected Messiah. He then retired to the solitude of the wilderness, where he completed his preparation for his great task. At first he identified himself with John's work, and some of the latter's disciples, with their master's encouragement, became his earliest followers. Jesus now returned to Galilee, where he began his own ministry, soon making his headquarters at Capernaum.

The spring of the following year (27 A. D.) he went up to Jerusalem to attend the Passover and seems to have remained there and in Judea for some months, perhaps until December. During this period, known as the early Judean ministry, it became evident that the leaders of the people, the Pharisees and scribes, would not accept the teachings of Jesus, which were of a pronounced spiritual and unconventional character and ignored the national aspirations of the people. He therefore decided to go back to Galilee.

MINISTRY IN GALILEE. This decision was confirmed by Herod's imprisonment

of John the Baptist, which took place at this time. The ministry of Jesus thereupon began to stand out more distinctly on its own merits. His reputation as a teacher and worker of miracles had been constantly growing, and his fame at once spread throughout the whole region. The ministry in Galilee constitutes the chief part of the public work of Jesus, both in length of time and in central importance. These years are characterized by the organization of the kingdom, including the choosing of his disciples; by the ministry of evangelization, accomplished by means of his teaching and works, and including a number of preaching tours; by the instruction of his disciples; and by the growing hostility of the scribes and Pharisees.

While these characteristics are present throughout the entire period, yet a difference of emphasis is apparent. In the earlier part he gradually gathers a circle of disciples about him as the result of his teaching and his deeds of mercy. First those who had earlier been attracted from John's company are called by him more definitely. Others follow; and about the middle of the period he chooses the Twelve who are to constitute the inner circle of disciples. This is followed by the Sermon on the Mount, in which he sets forth the organic ideas, or constitution, of his proposed kingdom.

The instruction of his disciples is more prominently emphasized as this period draws to a close. During its last few months Jesus withdraws with them into northern Palestine, where they will be more by themselves, and here he tries to bring them into a fuller realization of the spiritual character of his kingdom, involving unselfish service for the good of others, and how it can come only through his own death. But he declares also that such death for others is the road to life, and that he will demonstrate this by his own return from the grave.

THE CLOSING MINISTRY. Realizing that conditions were ripe for the culmination of his work, Jesus takes his disciples and sets out for Jerusalem, probably late in the year 29 A. D. Instead of taking the most direct route, however, he goes through Perea, to the east of the Jordan, occupying five or six months in the journey and continuing his work in all of its characteristic features in what is known as the Perean Ministry.

Thus he arrives at Jerusalem at the time of the Passover in the spring of 30 A D., with the issues clearly drawn. Making his home at Bethany, Jesus goes into the city each day but one, during what is known as the passion week, and returns at night. On Thursday night of Passover week, he gathers his disciples in an upper room to observe the supper, and tells them of the end and of the future. On this very night, Judas, one of his own inner circle, betrays him to the Jewish leaders. He is taken before the highest Jewish tribunal and condemned to death because of his religious claims. Early in the morning he is taken before Pilate, the Roman governor, for he alone had the power of life and death. Pilate finds no fault in him, but finally condemns him to death by crucifixion in response to the clamors and threats of the populace. Bearing his own cross to Golgotha, the place of execution outside the city walls, he is there crucified between two thieves.

They put his dead body in a new rock-hewn tomb; and the third day, Sunday morning, some of the women went to anoint it with spices. But it was not there. On their way back Jesus appeared to them alive and told them that he would meet his disciples in Galilee. During the next 40 days he appeared to certain of their number at different times, then to all of them, then to a still larger company; and finally met the eleven on an appointed mountain in Galilee, from which he finally disappeared from their sight, after charging them to make his gospel known to the ends of the earth.

Various interpretations have been put upon the story of the Resurrection. It is certain, however, that the disciples, whom the death of Jesus had plunged into black hopelessness, became so thoroughly convinced that he was alive and

with them in spiritual presence and power, that their despair was turned into exuberant and enthusiastic rejoicing, in the strength of which they entered with absolute courage and faith upon the task which he had assigned them, undaunted by the opposing power of the Roman Government and the vast inertia of heathenism. This faith has also been the animating inspiration of Christianity throughout its course in history See CHRISTIANITY; RELIGION.

Jet, a mineral supposed to be a kind of lignite or anthracite. It takes a high polish and is so hard and compact as to be susceptible of being cut and carved into ornaments, especially dress trimmings. It is found in Bavaria, France, Germany and Spain; and has been mined for centuries near Whitby, England, where, previous to the time of Queen Elizabeth, the jet industry was extensive.

Jette, Sir Louis Amable (1836-), a Canadian lawyer, born in L'Assomption, and educated at L'Assomption College. A leader of the Canadian bar, he practiced in Montreal and on one occasion appeared before the Privy Council of England in behalf of the Quebec Government. As a Liberal, he sat for Montreal East in the House of Commons from 1872 to 1878, and from 1878 to 1898 he was a puisne judge of the Superior Court of the Province of Quebec. He then retired, to be reappointed in 1908. Meanwhile, 1898 to 1908, he was lieutenant-governor of Quebec, and in 1909 he was appointed chief justice of the Court of the King's Bench, Province of Quebec.

Jet'ty, a dike or construction of masonry or timber at the mouth of a river or across a harbor. Its object is to increase the current by narrowing the channel, by which means the more rapid flow of water tends to scour out a deeper bed and carry away the finer particles of floating sand, etc., into the sea, instead of depositing them on the bottom of the channel. The system is an old one, as a number of rivers in Europe were jettied over 100 years ago. The first jetties built in the United States were those constructed in 1875 by James B. Eads at the mouth of the Mississippi River at South Pass. This channel had originally a dike on the east 11,800 ft. long, and one on the west 7800 ft. long, which deepened the channel to nearly 30 ft. in nine months after its construction. These dikes have since been enlarged several times. Other jetties are those at Galveston, Tex., Yaquina Bay, Ore., St. Johns River, Fla., and at Charleston, S. C. In Europe jetties are built on the Danube, Oder and Vistula rivers, and in the harbors of Dunkirk and Calais in France.

The usual method of building dikes for jetty work is first to make a mattress of brush and willows, about 100 ft. long and about 40 ft. wide, by entwining them with heavy planks of wood, spiked or pinned together with wooden pins. These are floated to the channel and weighted down by dumping large stones and rubble upon them. When the entire mass is sunk to the bottom, another mattress is put on top with stones, and so on until the pile reaches above the water. The sediment, silt and sand soon fill up all the crevices, and the jetty becomes a solid foundation on which to build a concrete capping. The jetty at Galveston, Tex., cost over $8,000,000, and it is sometimes called a sea wall, or breakwater. See BREAKWATER.

Jevons, *Jev'unz,* **William Stanley** (1835-1882), an English author and political economist. He was born at Liverpool, educated at University College, London, and from 1854 to 1859 held a position in the Royal Mint of New South Wales. In 1866 he became professor of logic and political economy at Owens College, Manchester, resigning ten years later to accept the chair of political economy in London University. His works include *Elementary Lessons on Logic,* widely used as a textbook, *Theory of Political Economy, The Principles of Science, The State in Relation to Labour* and *Methods of Social Reform.*

Jew'elry, collectively the name applied to personal ornaments made of precious stones, gold, silver, coral and other

materials. The art of making jewelry is very old, specimens found in the tombs of the ancient Egyptians showing a degree of skill not surpassed at the present day, though these articles were made thousands of years before the Christian Era. The old jewelers of the East still adhere to the old methods of their forefathers, and fashion their ornaments with simple tools, depending upon their skill of hand and delicate taste in coloring for the perfection and beauty of the object. In Europe and America, however, dies for cutting and stamping and machines for rolling metals are very generally employed, enabling the manufacturer to produce at an expenditure of a few cents for labor an article which, if made wholly by hand, would cost as many dollars.

Much of the jewelry of cheap grade consists of an alloy plated with gold or other metal. Although when new such jewelry presents a fine appearance, it is not durable. Many articles are also placed on the market, as made of gold or as gold plated, which contain no gold at all, but are made of an alloy which, when polished, resembles gold so closely that the articles cannot be distinguished from the genuine ones by those who are not familiar with the appearance and weight of gold. France, Germany, England and the United States are the leading countries in the manufacture of jewelry. See GEMS, ARTIFICIAL.

Jew'ett, Sarah Orne (1849-1909), an American story-writer, born in South Berwick, Me. She began her literary career in 1869 by publishing a story in the *Atlantic Monthly*. She treats the gentler aspects of New England life with much charm, and her stories are a valuable addition to American fiction. Among her works are *A Country Doctor, Old Friends and New, The Country of the Pointed Firs, A Marsh Island* and *Betty Leicester.*

Jews, the name applied to a people of Semitic origin, also known as Hebrews and as Israelites. Of the three names, *Hebrews* is properly applied to these people at the time they existed as a nation; *Israelites* (Sons of Israel) has a distinctly religious significance; *Jews* is the name given them since the Babylonian Captivity, and may be said to embody both their nationalistic and religious aspects. The Jews are of short stature, and have dark hair, skin and eyes and full lips. They have strong family and religious instincts, moral courage, an aptitude for business and facility in acquiring wealth, and great intellectual ability. To them the world owes the preservation of the monotheistic form of religion—the belief in one God.

HISTORY. The Biblical account of the Hebrews previous to the Captivity may be summarized as follows. Having become established in Canaan, under a patriarchal form of government, they were compelled by a famine to take up their abode in Egypt. Here, though they became enslaved, they grew in numbers, and in 1320 B. C., under the leadership of Moses, escaped from their bondage. After 40 years of wandering they reached Palestine, the Promised Land. Dispossessing the native inhabitants of the country, they settled down to live an agricultural life, with a church form of government. Tiring of the rule of the judges, they set up a monarchial form of government under Saul, who was succeeded by David. Solomon, David's son, was the last king of the united nation, for under his son, Rehoboam (937 B. C.), the kingdom was divided (See JUDAH, KINGDOM OF; ISRAEL, KINGDOM OF). The two rival kingdoms, Israel and Judah, existed for some time, but in 722 B. C. Israel was overthrown by Sargon, King of Assyria, and the ten tribes composing that kingdom were carried away into captivity, after which they were lost to history, while Jerusalem, the capital of Judah, was destroyed by Nebuchadnezzar, of Babylon, in 586 B. C. This date is the beginning of the period known as the Babylonian Captivity. Cyrus of Persia, who later overthrew the Babylonians, gave the Hebrews permission to return to Jerusalem to rebuild their Temple, and

in this period they adopted the Priestly Code brought from Babylon by Ezra. The adoption of this code marks the real beginning of *Jewish* history.

After the death of Alexander the Great, the Jews were subject to the Egyptian Ptolemies and to the Seleucid rulers in Syria. Later, under the Maccabees, they rose in revolt against Syria, and in 166 B. C. Judas Maccabæus led them to victory. The Maccabæan family was in power until the capture of Jerusalem in 63 B. C., by Pompey, when Judea was made dependent on the Roman Province of Syria. After a series of stubborn rebellions against Rome, Jerusalem was sacked in 70 A. D. by Titus, and the remnant of the people who survived the massacre commanded to disperse. Since that time the Jews have settled in various parts of the world, and have become famous as financiers and traders, at the same time retaining their racial identity. According to official statistics, in 1912 the Jews numbered 11,817,783. Of these, 1,894,000 were in America. A recent movement looking forward to the reviving of the Jewish state has attracted considerable attention. This is discussed under the title ZIONIST MOVEMENT. For further details of the history of this people, see MOSES; DAVID; SOLOMON; PALESTINE; JERUSALEM. For details concerning their religious history and beliefs, see the various books of the Old Testament; also PRIEST; HIGH PRIEST; ARK OF THE COVENANT; TEMPLE, THE; TABERNACLE; SYNAGOGUE; JUDAISM.

Jew's Harp, a small musical instrument made of metal and shaped in the form of a lyre. It has a tongue of thin metal which is struck by the finger in playing, the instrument being held the while between the teeth, and the melody being produced by breathing upon the tongue.

Jig'ger, Chigger or **Chigoe,** a family of parasitic fleas found in warm climates. The male is winged and does not pass his entire life as a parasite; the female is wingless, and burrows beneath the skin of the host upon which she finds herself and there lays her eggs. When these hatch, the young larvæ feed upon the blood and form a festering wound, in which the pupal state, or third stage of their life, is passed. The adults emerge from the wound and seek fresh spots in which they may burrow. A fester made by the jigger is very painful and sometimes even fatal. When first noticed, it should be completely cut or burned out with antiseptic instruments. Rubbish heaps in which the eggs may hatch should be removed as soon as possible, and always be sprinkled with pyrethrum, or Persian insect powder.

JIMSON WEED

The stems and leaves of the butterfly weed, or pleurisy root, in southwestern United States, are often covered with red bugs called jiggers; these are not true jiggers of the Flea Family, but are Arachnids whose better name is harvest mite. See MITE; INSECTA; FLEA.

Jim'son Weed, Thorn Apple or **Jamestown Weed,** a tall herb of the Nightshade Family and hence a cousin of the potato and the tobacco plants. It

has a straight branching stem, coarse, broad leaves and creamy-white flowers that are much like those of the cultivated petunia. The seeds are flat and brown and are incased in a four-parted pod that opens in the autumn to scatter its contents. From seeds and leaves the drug stramonium, a powerful poison, is obtained. Jimson weed grows in waste places and should be recognized to be avoided; it is native in Central America. In the accompanying cut, A shows a stalk with leaf and opening buds, and B is a partly-opened bur.

Jin'goism, a term coined from the expression "by Jingo" and, as used in modern politics, applied to the policy of an individual or party habitually displaying a warlike attitude. The word was first used in this connection in 1877, when England was undecided whether to interfere forcibly in the war between Russia and Turkey. Gladstone led the Liberal Party, which was in favor of leaving Turkey alone, while the Conservatives, under Lord Beaconsfield, the premier, were determined to protect Turkey against Russia. The excitement over the situation became intense, and whenever the fighting spirit prevailed the words adopted from "McDermott's War Song" were sung. The chorus ran thus:

"We don't want to fight,
But, by Jingo, if we do,
We've got the ships,
We've got the men,
We've got the money too."

The term, which corresponds to "spread eagleism" in America, has ever since been applied to the warlike advocates of England, and has been taken up in the United States with the same meaning.

Jinrik'isha, a light, two-wheeled vehicle resembling a gig, but with a crossbar near the outer ends of the shafts. It was invented in 1869 by an American Baptist missionary, but has been improved by various Japanese, who have added springs, wheel guards and a top. The jinrikisha is usually drawn by one man; but, if the load is heavy, there may be one or two additional runners. The jinrikisha was first used in Japan, where it soon superseded the *kago,* or palanquin, and has been introduced into India, China and other Asiatic countries.

Jiujitsu, *Joo' jit" soo,* a method of self-defense without weapons, whereby Akiyama, a celebrated physician of Nagasaki, Japan, taught 303 methods of throwing or disabling an opponent. Since the 16th century this method of self-defense has been popular in Japan, and there are said to be 40 different schools in Tokyo alone. Members of the police force in Tokyo, Kobe and Yokohama, after binding themselves not to reveal these secrets, are taught many special phases of the art. To gain a complete knowledge of the system is very difficult, since few are permitted to know methods by which a master of the science can easily dislocate a victim's hip or shoulder, break an ankle or lacerate a tendon.

Joan of Arc, *Jone wv Ark',* (1412-1431), a French heroine, also called the Maid of Orleans, a young peasant girl living during the English invasions of France in the Hundred Years' War (See HUNDRED YEARS' WAR). Believing that she heard voices from heaven and saw visions of the saints urging her to deliver her country, she at last gained admittance to the ruler of France, and her earnestness so impressed him that he gave her the command of the French troops in 1429. Her presence proving an inspiration to the disheartened soldiers, the siege of Orléans was soon raised. She defeated the English in four engagements and saw the Dauphin crowned at Rheims. When she no longer heard the heavenly voices, deeming her mission over, Joan asked to be released, but the King would not let her go. She was severely wounded in an attack on Paris. A little later she and her family were ennobled. In May, 1430, she was captured by the Burgundians, who sold her to the English for 16,000 francs. The Maid was kept in prison for a year and then tried and condemned as a sorceress and a heretic.

She was burned at the stake at the market place of Rouen, 1431. In 1908 she was beatified, in 1919 canonized.

Joaquin, *Wah keen'*, Miller. See MILLER, CINCINNATUS HEINE.

Job, *Jobe,* the name of an ancient Hebrew poem, forming one of the books of the Old Testament; also the name of the hero of this poem. Job, a sincerely pious man, has been blessed with seven sons and three daughters, and great material prosperity. The Adversary obtains leave to tempt this upright man, to see whether his faith in God will survive adversity. Numerous misfortunes fall to his lot: he is deprived of children and possessions and stricken with a loathsome disease, but submits in patience to the will of God. Three friends come to console him and in the discussion which follows Job is told that sin is the cause of his sufferings. A considerable portion of the poem is occupied with the speeches of these friends and Job's replies. In the closing chapters God speaks to Job out of a whirlwind, and in the conclusion he is restored to health and prosperity. Modern critics hold to the opinion that the book of *Job* is partly historical and partly allegorical, but its date and authorship cannot be ascertained with certainty. See BIBLE, subhead *The Old Testament.*

Jo'el, one of the books of the Old Testament; also the name of its author, one of the 12 minor Hebrew prophets; according to the Septuagint, the fourth of them. Joel was of the tribe of Reuben and a contemporary of Hosea and Amos. His book begins with a warning of impending drought and visitation of locusts, a figurative picture of coming invasions. Then follow an exhortation to repent, fast and pray, that these calamities may be averted; a promise of blessing instead of disaster; the contrast between the destruction of these nations which had aided in scattering Israel, and the restored people of God. See BIBLE, subhead *The Old Testament.*

Johannesburg, *Yo hahn' es burg,* a city of the Province of the Transvaal, South Africa, 35 m. s. of Pretoria. Railroads connect it with Port Elizabeth, Cape Town, Durban and Delagoa Bay. Electric lighting, street cars, the telegraph and telephone add to the conveniences, and there are several theaters, clubs, a courthouse, a stock exchange and a public library. It is in the center of the Witwatersrand gold fields. A Boer monument near the suburb of Krugersdorp commemorates the independence of 1880. The city was captured by the British under Lord Roberts in 1900, during the Anglo-Boer War. Population in 1904, 158,580.

John (about 1166-1216), King of England from the death of his elder brother, Richard I, in 1199, until 1216. He had made several attempts to usurp the throne, one being carried on during the absence of Richard on the Third Crusade (See CRUSADES). Upon John's accession, the French provinces favored his nephew Arthur, and a war ensued in which John lost all of his French possessions. Through disagreement with the Pope, John was excommunicated until he yielded England as a fief to the Pope (See INNOCENT, subhead *Innocent III*). John's autocratic rule led to an uprising among the nobles, which culminated in his entrapment at Runnymede, where he was forced to sign the Magna Charta on June 15, 1215; by this act he promised to give up many of his arbitrary rights (See MAGNA CHARTA). John soon showed that he had no intention of keeping his word and the barons offered the crown to Louis, the Dauphin of France. Before the question was settled, John died suddenly at Newark.

John III, or **John Sobieski,** *So byes' ke,* (1624-1696), King of Poland from 1674 until his death He was the son of a noble of Cracow, and after completing his education he entered the army, where he at once attracted attention and attained promotion through his bravery and skill. At the conclusion of the war against the Russians and Swedes, Sobieski was brought forward by one party as successor to the King, who had resigned (1660). His election,

however, did not occur until 1674. His reign is marked by numerous wars, in which John showed skillful generalship, but his policies were often influenced by the whims of his wife, through whose advice he gave up an Italian alliance and aided the Austrians against the Turks. His assistance here was not fully appreciated and was never suitably rewarded. In his later years John was less successful in his wars abroad and in his government at home, and he was unable to free Poland from internal strife.

John Bull, the popular name of personification for the English nation, is of obscure origin. Its first literary use appears to have been in the *History of John Bull,* written in ridicule of the Duke of Marlborough by Arbuthnot.

John, Epistles of. See JOHN, SAINT.

John of Gaunt, *Gahnt,* (1340-1399), Duke of Lancaster, fourth son of Edward III of England, born at Ghent. He was brother of Edward, the Black Prince, under whom he served in the French wars. John married Constance, daughter of Peter the Cruel, King of Castile, upon whose death John invaded Castile to claim the kingdom for his wife. His expedition was not successful, but a treaty was made by which his daughter married Henry Trastamare, Peter's successor, and became Queen of Castile. John's eldest son became Henry IV of England, through whom Henry VII descended.

John, Saint, one of the Twelve Apostles of Christ, probably born in Bethsaida, a small town upon the Lake of Gennesaret. He was the son of Zebedee, a fisherman, and Salome, one of the women who purchased spices to anoint the body of Jesus. John was one of the group of three disciples admitted to a peculiarly close intimacy with Christ, the other two being Peter and James, and is distinguished among the Twelve as "the disciple whom Jesus loved." After the Ascension he is known to have been in Samaria with Peter, confirming the work begun by Philip, and it is thought that the latter years of his life were spent chiefly at Ephesus. He was banished to Patmos, probably during the latter part of the reign of Domitian, 95 A. D., where he wrote the *Book of Revelation* (See REVELATION, BOOK OF). He returned to Ephesus the following year and is thought to have died there.

John's other writings consist of his Gospel (See GOSPELS, THE) and three Epistles. The first Epistle is a tract of a doctrinal nature, addressed particularly to the Gentiles in Asia Minor. The second, containing but 13 verses, is an exhortation to persevere in love, faith and godliness and to beware of false teachers. The third, consisting of 14 verses, is addressed to "the well-beloved Gaius" and is of a personal nature.

John the Baptist, a prominent character of the New Testament, son of Zacharias and Elisabeth, the latter of whom was a cousin of Mary, mother of Jesus. It was John's special mission to prepare the way for the ministry of the Messiah, and in the year 26 A. D. he was in the wilderness of Judea, clad in a garment of camel's hair, calling upon the people to repent. He baptized Christ in the River Jordan and continued to preach until imprisoned by Herod Antipas. This official caused him to be beheaded, to gratify the malice of his wife, Herodias.

Johns Hopkins University, at Baltimore, Md. (1867.) This is an institution of university grade founded by Johns Hopkins, who made a bequest of $7,000,000 for founding a university and a hospital. The resources of the university now amount to about $12,000,000. The university was opened in 1876 under the presidency of Daniel Coit Gilman, who associated with him in the faculty a number of eminent scholars and specialists. The university maintains a graduate school, a medical school, a school of hygiene and public health, a college of arts and sciences, and a department of engineering. It also provides afternoon and Saturday courses of college grade for teachers and others, evening courses in business economics and in technical subjects, and a six weeks' summer session. It affords unusual opportunities

for original research, and a large number of scholarships and fellowships are annually awarded to students desiring to do advanced work in science, medicine, and literature. In 1889 the Johns Hopkins Hospital was opened.

The university is also noted for the scholarly periodicals published, among which are the Studies in Historical and Political Science, the American Journal of Mathematics, the American Chemical Journal, The American Journal of Philology, Modern Language Notes, etc. The library contains over 212,000 volumes. In 1918-19 the faculty numbered 350 and there were nearly 2000 students. See GILMAN, DANIEL COIT; REMSEN, IRA.

Johnson, Andrew (1808-1875), seventeenth president of the United States, born at Raleigh, N. C. At the age of ten he was apprenticed to a tailor, and was taught the alphabet by his fellow workmen. After his marriage, his wife, who was a woman of refinement, taught him arithmetic and writing. He did all that he could, however, to supplement his educational deficiencies by wide reading. In 1826 he moved to Greeneville, Tenn.

In those days Tennessee was controlled by the aristocratic landlords; and Johnson, who had natural ability as a political leader, organized the opposition and was elected alderman in 1828, continuing in office by reelections until 1830, when he became mayor of the city. In 1835, 1839 and 1841 he was elected to the State Legislature, and to the lower house of Congress in 1843, where he served for ten years. He was governor of Tennessee from 1853 to 1857, when he became a member of the United States Senate. Here he was the Southern spokesman of the Union element, being radically opposed to secession. In 1862 Lincoln appointed him military governor of Tennessee, in which capacity he rendered valuable service to the Union cause. In 1864 he was elected vice-president of the United States on the ticket with Lincoln, and became president in April, 1865.

Johnson's administration is memorable as the period of reconstruction, and for the prolonged contest on that subject between the President and Congress, leading finally to the President's impeachment. Johnson was acquitted, the vote for conviction lacking one of the required two-thirds. After concluding his term of office, Johnson retired until 1875, when he was elected to the United States Senate. He died the same year, after serving in the extra session of Congress. See Study Guides.

Johnson, Emily Pauline (1862-1913), a Canadian poet and entertainer, born on the Six Nation Indian Reserve, Ontario. She was the daughter of the head chief of the Mohawk Indians. Her first verses appeared in the *Gems of Poetry,* New York, and she afterwards contributed to the English, American and Canadian press, her best work treating of Indian subjects. This group of poems includes *The Death Cry, A Cry from an Indian Wife, As Red Men Die* and *In April.* The power and delicacy of her prose work is displayed in *Prone on the Earth.* In 1894 she visited London, where she published a collection of her poems entitled *The White Wampum,* and in July, 1906, she appeared in London publicly.

Johnson, Samuel (1709-1784), an English writer and dictionary maker, born in Lichfield. He entered Oxford in 1728, struggled with poverty and was forced to leave without taking a degree. From school teaching he turned to writing. In 1735 he married Mrs. Elizabeth Porter, a widow of coarse manners and vulgar dress, whom he loved passionately and whose modest fortune he soon squandered. Two years later they removed to London, and in 1738 he became a regular contributor to the *Gentleman's Magazine.* In the same year appeared *London,* a poem, which was at once successful. In 1749 he published the finest of his poems, *The Vanity of Human Wishes,* and not long after, his tragedy *Irene* was produced at the Drury Lane Theater. The next year he began a periodical modeled on the *Spectator,* called the *Rambler,* which ran for two

years. A second periodical, the *Idler,* was begun in 1758. From 1747 to 1755 he labored patiently on the preparation of the *Dictionary of the English Language. Rasselas,* a novel, was written in a week to defray the expenses of his mother's funeral. In 1762 he received a pension, and was given a doctor's degree by the University of Dublin three years later. His famous friendship with the Thrales was begun about this time and continued for 16 years. In 1773 his friend James Boswell accompanied him on a tour to Scotland and the Hebrides; two years after their return Johnson published a record of this journey. In 1775 he received the doctor's degree from Oxford. His last work was the *Lives of the Poets,* a collection of biographies representing his best literary and critical work.

Boswell, Johnson's biographer, recorded minutely the eccentricities of this whimsical, absent-minded scholar. His face was scarred by a disease which seriously injured his eyesight, and he was subject to queer convulsions and antics which would frequently amaze bystanders. Once he suddenly twitched off the shoe of a lady who sat by him. Yet, in the famous Literary Club of London, popularly known as Johnson's Club, where belonged Garrick, Reynolds, Goldsmith, Gibbon, Burke and Boswell, Johnson far outshone the others in brilliant conversation, and no man of his generation exercised so great an influence as he in the world of letters. His style ordinarily was ponderous, Latinized; his fondness for big words was aptly described by Goldsmith, who said that Dr. Johnson would "make little fishes talk like whales." In the *Lives of the Poets,* however, he displayed a genuine gift of literary expression. His criticisms seem narrow and outgrown at the present day, but he was an independent thinker, and his writings compel the reader's respect if not his approval. The *Dictionary* is readable by reason of his apt choice of quotations, although prejudiced and strange definitions often occur, as well as etymological errors.

It was Johnson's powerful personality that made him the giant of a group of able writers, and this same force of character makes him still a vital figure. A prey to ill health, poverty and melancholy, he never ceased to seek after truth, to shun falsehood and insincerity and to express his convictions with manly independence. See BOSWELL, JAMES.

Johnson, Tom Loftin (1854-1911), former mayor of Cleveland, Ohio, born in Georgetown, Ky. He studied in the public schools of his birthplace, and then was employed in a rolling mill, after which he went into the office of a street-railway company and soon became its secretary. He invented an improved steel rail, which brought him a large fortune. He served in Congress from 1891 to 1895, and was mayor of Cleveland from 1901 to 1910. As mayor, he secured lower street car fares and used his influence in behalf of the people.

Johnson, Sir William (1715-1774), an American colonist and soldier, born in Ireland. He came to New York in 1738 to manage his uncle's large estate in the Mohawk Valley. He colonized the country and engaged in trade with the Indians of the Six Nations, whom he treated with such absolute justice that he gained great influence over them. He became a master of their language, habits and beliefs, and was adopted by the Mohawks as a sachem.

In 1774 Governor Clinton appointed him colonel of the Six Nations; at the outbreak of the French and Indian War he was given full charge over them, with the military rank of major-general; and after the war he was made superintendent of Indian affairs for life. For his efficient service during the war he was rewarded with the baronetcy, a cash gift of $25,000 and a grant of 100,000 acres of land north of the Mohawk. On this tract he built Johnson Hall in 1764, where he lived in the style of an English baron. Here also he established the village of Johnstown. He gave much attention to agriculture, and introduced sheep and blooded horses into the Mohawk Valley.

Johnson City, Tenn., a city of Washington Co., 106 m. n.e. of Knoxville, on the Southern and other railroads. The city has important manufacturing interests and contains foundries and machine shops, rolling mills, woodworking establishments, a tannery, several brick plants and an iron furnace. A branch of the United States Soldiers' Home is located here. Settled about 1870, Johnson City is governed under a charter of 1897. Population in 1920, 12,442.

Johnston, Albert Sidney (1803-1862), an American soldier, born in Washington, Ky., and educated at West Point. He served in the Black Hawk War and in the Texan army as a private. Subsequently he commanded the Texan army and became secretary of war in the new republic. In 1840 he resigned and thereafter conducted a plantation until the outbreak of the Mexican War, after serving in which he became paymaster in the United States army. In 1860 he assumed command of the Pacific Department, but at the outbreak of the Civil War entered the Confederate service in command of the forces in the West. He exhibited marked efficiency in defending Kentucky and Tennessee during the winter of 1861, but was killed the following April while leading a brilliant charge at Shiloh. Johnston was esteemed especially for his courage and for his management of large bodies of troops.

Johnston, Alexander (1849-1889), an American historian, born in Brooklyn, N. Y., and educated at Rutgers College. He studied law and became professor of jurisprudence and political economy at Princeton. He made valuable contributions to American history. These include *History of American Politics, History of the United States for Schools* and *History of Connecticut.* Moreover, he edited *Representative American Orations,* assisted in editing Lalor's *Cyclopædia of Political Science* and wrote the article on the history of the United States for the *Encyclopædia Britannica.*

Johnston, Joseph Eggleston (1807-1891), an American general, born in Prince Edward County, Va. He graduated from West Point in 1829, a classmate of Robert E. Lee. He fought in the Black Hawk and Seminole wars, and served with great bravery in the Mexican War. In 1861 he became brigadier-general in the Confederate service, where he had command of the Army of the Shenandoah. He also came to the help of Beauregard at the Battle of Bull Run, and for a time had full command of the Confederate forces in Virginia. In 1863 Johnston attempted to relieve Vicksburg but failed. In opposing Sherman's march on Atlanta in 1864 he was again defeated after a stubborn resistance. He was then relieved of his command.

In 1865 General Lee placed Johnston again in command with orders to "drive back Sherman." Sherman's force was nearly four times as large as Johnston's, and, hearing of Lee's surrender, he surrendered his own force, Apr. 26, 1865. After the war Johnston engaged in business in the South. He was elected to Congress from Virginia in 1876, and was appointed United States commissioner of railroads by President Cleveland, retaining this position until his death. Although Johnston lost several important battles, military critics agree in ranking him one of the greatest generals of the Civil War. He was also a man of ability and culture in civil life. He wrote a *Narrative of Military Operations During the Late War.*

Johnston, Mary (1870-), an American novelist, born at Buchanan, Va., and educated there. Her first novel, *Prisoners of Hope,* which appeared serially in the *Atlantic Monthly,* attracted considerable attention, and was followed by *To Have and to Hold* and *Audrey,* all three being romances of colonial life in Virginia. She has also written *Sir Mortimer, Lewis Rand* and *The Long Roll.*

Johnstown, N. Y., county seat of Fulton Co., 48 m. n.w. of Albany, near Gloversville, on Cayadutta Creek and on the Fonda, Johnstown & Gloversville Railroad. Johnstown was the scene of many important councils with the Indians and there are various buildings of

historic interest. It has important manufactories of gloves, mittens, leather, baseballs, glove-makers' tools, knit goods, etc. Population in 1920, 10,905.

Johnstown, Pa., a city of Cambria Co., 39 m. s.w. of Altoona and 75 m. s.e. of Pittsburgh, at the junction of the Little Conemaugh River and Stony Creek, which form the Conemaugh River, and on the Pennsylvania, the Baltimore & Ohio and other railroads. The city is located at the base of the Allegheny Mountains, on level ground extending for some distance along the river and nearly enclosed by high hills. The city has an elevation of 1200 ft. above sea level. There is an excellent system of electric railroads, which extend to the near-by towns and cities. The situation of Johnstown in a coal and iron region, combined with its great water power, has made it an important manufacturing center. Johnstown contains 23 acres of public parks, and their number and arrangement add to the beauty of the city. Roxbury Park, about three miles from the city, is reached by electric lines. The streets are well paved, and there are many handsome residences.

Among the noteworthy buildings and institutions are the Conemaugh Valley Memorial Hospital, city hall, high school, First National Bank Building, Johnstown Trust Building and Cambria Free Library. There are many churches. Johnstown is well known as the center of an extensive iron and steel industry. Several large steel plants employ thousands of men. Among other industrial establishments are street-car rail factories, cement works, tanneries, furniture factories, wireworks, furnace works, flour and planing mills, brickyards, potteries, foundries and machine shops, iron-plate mills, and manufactories of fire-clay products, woolen goods, enamel ware, wall and tar paper, ribbons, skirts, stoves and paints. Fire clay and limestone are also found in the vicinity, and there are extensive coal-mining and shipping interests.

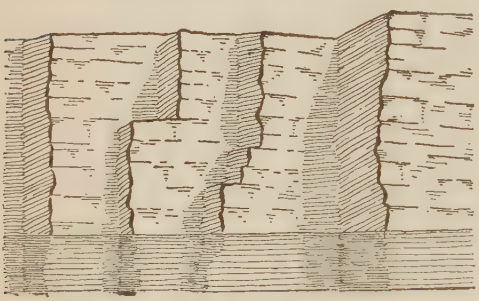
A settlement was first established here in 1791 by Joseph Jahns, in whose honor the town was named. It was incorporated as a borough in 1831 and as a city in 1889. The village of Conemaugh, with extensive ironworks and railroad facilities, now forms part of the city of Johnstown. On May 31, 1889, during a heavy rainfall the Conemaugh Dam gave way, releasing Conemaugh Lake, a body of water two miles long and over a mile wide, which engulfed the valley and nearly destroyed the city, and several other towns and villages in the valley. The total loss of life was over 2000, and the estimated property loss was about $10,000,000. Generous aid came from all parts of the country and the city was quickly rebuilt. Population in 1920, U. S. census, 67,327.

Joint, in anatomy, the juncture of two or more adjacent parts of the skeleton, whether bone or cartilage. Joints are classified as movable and immovable. Immovable joints are always between bones. They are found in the skull. There are four kinds of movable joints: ball and socket, hinge, pivotal and gliding joints. Ball and socket joints, of which the hip and shoulder joints are the most important examples, admit of movement in many directions. In each the enlarged and rounded end of a long bone fits into a hollow of another bone, where it is held firmly by ligaments and surrounding muscles. Hinge joints are formed by a series of grooves and ridges, by means of which the bone can move only in two directions. The knee joint, the joints of the fingers and the joint connecting the lower jaw and the cranium are of this type. Pivotal joints are those which admit of a rotary, pivotal motion, like that possible for the head, and in the elbow, which admits of a twisting movement. Gliding joints are found in the wrist, ankle and between the vertebræ. They occur where the bones are packed close together and glide one on top of the other.

The ends of a movable joint are incased in a thin sac of cartilage and covered with a layer of membrane which lubricates the joint with its fatty secretion. A dislocated joint should imme-

diately be reset. Delay causes swelling, which, however, can be kept down with hot applications until the arrival of a physician.

Joints, in geology, the vertical or highly inclined divisional planes which traverse rocks, dividing them into blocks of greater or less regularity. Series of parallel planes of fracture occurring at right angles with other series are the usual order. Disturbances of the earth's crust have caused the rock to separate along these planes, the outer portion falling away and leaving the remaining bulk with flat wall surfaces and a succession of projecting and retreating corners like a flight of gigantic steps turned endwise.



JOINTS IN ROCK

Joint-Stock Company, a form of partnership under which a number of persons contribute *stock,* that is *funds,* in order that as a company they may engage in business or trade. Such a company has not the peculiar attributes of a corporation. The stockholders hold shares, and profits are divided in proportion to the number held. The stockholders elect directors and these choose officers to manage the business under their general direction. Most states permit the incorporation of such companies by five or more persons, upon the filing of signed articles of association with the proper state officer. Joint-stock companies which add the word *limited* after the company name must comply with the state laws on that subject. In such companies the liability of the individual member is limited (1) to the amount unpaid on the shares which he has agreed to purchase, or (2) to the amount which he has specifically agreed to contribute to its assets should the company go out of business. In other joint-stock companies there is no limit to the liability of members.

Joliet, *Jō' li et,* Ill., a city and county seat of Will Co., 37 m. s.w. of Chicago, on the Des Plaines River, on the Illinois and Michigan and the Chicago Drainage canals, and on the Chicago, Rock Island & Pacific, the Chicago & Alton, the Atchison, Topeka & Santa Fe, the Chicago, Lake Shore & Eastern and other railroads. There are electric car lines to all parts of the city and suburbs, and to Chicago. The Illinois and Michigan and the Chicago Drainage canals carry freight between Chicago and the Illinois and Mississippi rivers. The city is situated in a narrow valley on both sides of the river, and the volume of water from Lake Michigan down the drainage channel, the canal and the river, furnishes abundant water power. Large deposits of fine gray limestone known as Joliet limestone are found in the vicinity.

Joliet contains many miles of well-paved and shaded streets, and there are handsome residences and suburban homes. West Park and Highland Park are maintained by the city, while the street-car companies have added Dellwood and Electric parks, two attractive pleasure resorts. Among the noteworthy buildings are the Federal Building, courthouse, telephone building, Athenæum, a clubhouse for working men, a number of banks, good business houses, Union Station, the Auditorium, Masonic Temple, several theaters and the Commercial and Union League Club buildings. There are about 40 churches. The educational institutions include a beautiful township high school costing over $250,000, a public library, public and parochial schools and St. Mary's and St. Francis academies. Other institutions include St. Joseph's and Silver Cross hospitals, Swedish Orphans' Home, home for aged people and the Guardian

Angels' Home. The city is also the seat of the Northern Illinois Penitentiary.

Joliet is essentially a city of industries. The largest coke ovens in the country are located here as an adjunct to the great steel mills. There are also extensive rolling mills, horseshoe works, flour mills, paper mills, foundries and machine shops, marble works, tin-plate mills, nail factories, barbed-wire works, lime-kiln works and manufactories of boots and shoes, engines and boilers, steel cars, brick and tile, pottery, sash, doors and blinds, farm implements, art calendars, cigars, builders' hardware, cereal foods, stoves and ranges, chemicals, matches and furniture. The limestone quarries are extensively worked and afford excellent material for building construction. Joliet is known as one of the carnation cities, and there are a number of large greenhouses. Carnations are grown principally, but roses and chrysanthemums are grown for the general trade.

The first permanent settlement was made about 1831. The present name was adopted in 1845 in memory of Louis Joliet, who, with Marquette, visited the place in 1673 (See JOLIET, LOUIS). A city charter was granted in 1852. Population in 1920, 38,372.

Joliet, *Zho" lya'*, **Louis** (1645-1700), an explorer of the Mississippi Valley, born in Quebec and there educated by the Jesuits for the priesthood. Attracted by adventurous life in the woods, he soon became known as a voyageur, and in 1669, while exploring the shores of Lake Superior, he discovered a more direct route from the upper lakes to Montreal. In 1672 he and a Jesuit priest, Jacques Marquette, were selected by Frontenac to trace the course of the Mississippi, and in May of the following year, with six companions in two canoes, Joliet left Mackinaw and ascended the Fox River. Having crossed the Portage to the Wisconsin, on June 17 he entered the Mississippi, which he descended as far as the Arkansas River. He was then satisfied that the Mississippi emptied into the Gulf of Mexico, so he returned to Quebec by way of the Illinois River and Lake Michigan. His maps and records were lost on this homeward trip by the overturning of a canoe in the La Chine Rapids. In 1693 he was appointed royal hydrographer, and four years later he was granted the seigniory of Joliet, south of Quebec, which his descendants still retain.

Jo'nah, a book of the Old Testament, written by Jonah, one of the 12 minor Hebrew prophets. Jonah, according to *Second Kings xiv, 25,* was a contemporary of Jeroboam II. The book of *Jonah* is mainly narrative, and has a distinctly miraculous element which has led some critics to consider it a parable or simply fiction. Others, however, maintain that its historical accuracy is proved by Christ's reference to Jonah in *Matthew xii, 40.* See BIBLE, subhead *The Old Testament.*

Jones, Henry Arthur (1851-), an English dramatist, born in Buckinghamshire. His first play was produced when he was 27, and four years later he collaborated very successfully with Henry Herman on the drama *The Silver King.* In 1884 Mr. Jones began a series of social dramas, most of which met with remarkable success. Representative of these are *Saints and Sinners, Judah, The Crusaders, The Hypocrites, Chance the Idol* and *The Ogre.* His views of dramatic art are expressed in a collection of essays and lectures entitled *The Renascence of the English Drama.*

Jones, Jenkin Lloyd (1843-1918), an American clergyman, born at Cardiganshire, Wales. His parents came to America while he was still an infant. He was for three years a private in a Wisconsin battery in the Civil War. In 1870 he graduated from the Meadville (Pa.) Theological Seminary, from 1871 to 1880 was pastor of All Souls' Church, Janesville, Wis., and from 1875 to 1884 was secretary of the Western Unitarian Conference. In 1874 he organized the Western Unitarian Sunday School Society, of which he was secretary until 1880. In 1878 he assisted in the establishment of *Unity,* a weekly paper which is now the

organ of the Congress of Religion. Mr. Jones has been editor of this paper since 1879. He was instrumental in organizing All Souls' Church of Chicago, of which he became pastor in 1882. In 1905 this church became the Abraham Lincoln Center, an institutional church with Mr. Jones as director. In 1892-3 he was secretary of the World's Parliament of Religions, and in 1894 he was instrumental in organizing the Congress of Religion. From 1895 to 1897 he was first president of the Illinois State Conference of Charities, and since 1893 he has been lecturer at the University of Chicago. He is president of Tower Hill Summer School of Literature and Religion, and founder and first president of the Browning Society.

Jones, John Paul (1747-1792), a famous commodore who served with the Americans during the Revolution, born in Scotland. He entered the Scotch navy at the age of 15, engaged in the Virginia trade and came to Virginia, 1773. About this time he added the "Jones" to his original name, John Paul.

Jones offered his services to Congress when the Revolutionary War opened, and was given command of the flagship *Alfred*. The following year he was transferred to the *Providence*, with which he took many rich prizes. However, he was highly offended at his removal, which he considered an injustice, and was later put again in command of the *Alfred*, with which he succeeded in making many captures for the Americans. In 1778 he prowled about the British coasts with the *Ranger*, gaining many prizes, chief among them being the British sloop-of-war *Drake*, and in the following summer he was given command of the *Bon Homme Richard*. He achieved the greatest success of his career, when, Sept. 23, 1779, he completely defeated the British sloop-of-war *Serapis* off Flamborough Head. This was one of the stiffest and most murderous combats of naval history. Jones took his prizes to Holland, where the British Government demanded, but without effect, that he be surrendered as a pirate. After a trip to France, Jones returned to Philadelphia early in 1781. Congress thereupon passed a resolution in appreciation of his services. He later went to Russia, where, in 1788, he became rear-admiral in the service of the Empress. Because of the jealousy of the Russian officers he soon left for Paris, where he passed the remainder of his life. His burial place, long unknown, was found in 1905, and his remains were brought to Annapolis, Md.

After his victory over the *Serapis* France made Jones a Knight of the Order of Merit, Russia gave him the ribbon of St. Anne, and he was pensioned by Denmark.

Jones, Lewis Henry (1844-), an American educator, born in Noblesville, Ind., and educated at the Oswego Normal School. In 1871 he became a teacher in the Indiana State Normal School, and was subsequently instructor in the Indianapolis High School, principal of the Indianapolis Normal School, superintendent of the schools of Indianapolis and of Cleveland, Ohio, and president of the Michigan State Normal College. He is the author of *The Jones Readers* and of *Education as Growth*.

Jones, Samuel Porter (1847-1906), an American evangelist, popularly known as "Sam Jones," born in Chambers County, Ala. He was admitted to the Georgia bar in 1869, but after dissipation shattered his health he professed religion, and in 1872 was ordained in the Methodist Episcopal Church, South. He filled several pastorates during eight years, and for 12 years was agent for the North Georgia Orphanage. Meanwhile he had gained fame as a lecturer and evangelist, his address being characterized by extreme unconventionality. His works include *Sermons and Sayings by Sam Jones, Music Hall Sermons, Quit Your Meanness* and *Thunderbolts*.

Jonesboro, Ark., a city and the county seat of Craighead Co., 64 m. n.w. of Memphis, Tenn., and about 120 m. n.e. of Little Rock, on the St. Louis Southwestern, the Jonesboro, Lake City and Eastern, the Kansas City, Ft. Smith

& Memphis and other railroads. There are several important manufactories in the city, including flour mills, lumber mills, stave and heading factories, box factories and others. The exceptional railroad facilities contribute largely to its commercial importance. Grain, dairy products and live stock are the principal articles of trade. The first permanent settlement here was begun in 1870; the place was incorporated in 1882. Population in 1920, 9,384.

Jonquil, *Jon' kwil,* a beautiful garden herb of the Amaryllis Family often cultivated in greenhouses and known in many varieties. It is produced from a perennial bulb which sends out a flower stalk and a number of long, swordlike leaves. The flower stalk, which is hollow, lengthens rapidly just before the flowers are ready to bloom, and bears from one to three nodding, fragrant flowers. These flowers are very attractive, having a pale green sheath surrounding the tubular, five- or six-parted corolla, and above this, a short, saucer-shaped cup called a corona. Within the tube are six yellow stamens. The natural color of the flowers is rich yellow or white. The jonquil is one of the favorite spring blossoms and is classed with its near relatives, the daffodil and the narcissus.

Jonson, Ben (about 1573-1637), an English dramatist, born probably in Westminster. He studied at Westminster School and later (as is asserted without evidence) at Cambridge. Joining the army in Netherlands, he had opportunity to see something of the world, and upon returning to London his extraordinary talents as an actor compelled respect. By 1597 he had turned his attention to writing plays, and in the following year appeared one of the most famous of English comedies, his *Every Man in His Humour,* in which Shakespeare himself played a part. During the years which followed he wrote several dramas, masques and entertainments, was imprisoned occasionally but was generally in the King's favor, traveled on foot to Scotland and finally died in poverty. He wrote "comical satires," ridiculing society with its affectations in manners, speech and dress. The chief qualities of his work are humor, lyrical beauty, observation, learning and imagination. His plays include *Every Man Out of His Humour, The Case Is Altered, Cynthia's Revels, Volpone, Epicœne, or the Silent Woman, The Alchemist* and *Bartholomew Fair.* Among his lyrics, the one beginning "Drink to me only with thine eyes" is still a favorite.

Jop'lin, Mo., a city of Jasper Co., about 150 m. s. of Kansas City, on Joplin Creek and on the Missouri, Kansas & Texas, the St. Louis & San Francisco, the Kansas City Southern, the Missouri Pacific and other railroads. Joplin is the center of one of the largest interurban districts in the Southwest, more than a score of towns and cities in Missouri and Kansas being thus connected with excellent car service. Joplin is the largest city in southwest Missouri and is situated in an agricultural and fruit-growing district. The city is the commercial center of a vast zinc- and lead-mining region. Natural gas is furnished to the city from the Kansas oil fields. Among the noteworthy buildings are the Federal Building costing $150,000, a courthouse, an auditorium, Y. M. C. A. Building, hotels, opera houses, banks and substantial business blocks. There are a large number of churches. The educational institutions include a high school, public and parish schools, a commercial college and a Carnegie library. There is a well-equipped public hospital. The rapid growth of the city has been chiefly due to its extensive zinc- and lead-mining interests. The industrial establishments include smelting works, white-lead and paint works, flour mills, foundries and machine shops, wagon factories, engine and boiler works and planing mills. This city also does a large jobbing trade in groceries, mill stuffs and fruits.

The first settlement was made in 1838. Joplin was incorporated as a town in 1871. A neighboring village on the other side of Joplin Creek was united with the town under the name of Union City in

1872. In 1873 the name was changed to Joplin. A city charter was granted in 1888. The city derived its name from the creek, which was named in honor of Rev. Harris G. Joplin, a native of Tennessee. Population in 1920, 29,092.

Jor'dan, an important river rising in the northern part of Palestine, formed by the union of several small streams having their sources in the mountains. The river flows southward through Lake Huleh (the Biblical Merom) and the Sea of Tiberias (Galilee), and enters the northern end of the Dead Sea about 60 m. from its source; the length of the river itself, however, is 200 m., the variation being due to its winding course. The Jordan is very rapid, having a descent, during its course, of from 650 ft. above sea level to 1300 ft. below sea level. In some places it flows in a rapid course between steep cliffs and high banks. At its entrance into Lake Huleh it is about 100 ft. wide; between the Sea of Galilee and the Dead Sea there is a variation in width from 90 to 250 ft.; at its mouth the river is 540 ft. wide. Two streams of importance join it during its course and it is crossed by bridges at points a little below Lake Huleh and below the Sea of Tiberias. The River Jordan is of great historical interest. In its waters Christ was baptized, and Biblical narrative abounds in episodes connected with the stream.

Jordan, David Starr (1851-), an American educator and scientist, born at Gainesville, N. Y. He graduated at Cornell University in 1872, and subsequently taught in Lombard University, Galesburg, Ill., Indianapolis High School, Butler University, Indianapolis, and Indiana University. He became president of the last-named institution in 1885, retiring in 1891 to accept the presidency of Leland Stanford Junior University, California. In 1913 he became chancellor of this institution. He began the study of fishes under the instruction of Agassiz about 1872, and has served the Federal Government for many years in fish investigations. He is the author of many important scientific works and school texts; also of *Imperial Democracy, The Call of the Twentieth Century, The Philosophy of Hope* and *The Stability of Truth.*

Joseph, the eldest of the two sons of Jacob and Rachel. Born when Jacob was about 91 years of age, Joseph became the chief comfort of his father's old age, arousing thereby the jealousy of his elder brothers. Accordingly, after he had told them his two dreams, in which they were represented as bowing down before him, they sold him to some Ishmaelitish slave dealers. The lad was sold by the Ishmaelites to an Egyptian officer, and in Egypt he rose to a position of high honor. When the land of Canaan was oppressed by a famine and Joseph's brothers came to Egypt to buy corn, a reconciliation was effected. This interesting narrative of sacred history is related in *Genesis.* The settlement of the Hebrews in the land is supposed to have occurred during the rule of the Hyksos kings.

Joseph, the husband of Mary, mother of Jesus. He was of the line of David, a resident of Nazareth and a carpenter by trade. Little is known of him. He is supposed to have died before the beginning of the public ministry of our Lord. In the Roman Catholic calendar Joseph's Day is March 19.

Josephine, *Jo' zef een,* **Empress** (1763-1814), wife of Napoleon I. She was born on Martinique Island, and was the daughter of Lieut. Tascher de la Pagerie. She married Vicomte de Beauharnais, and became the mother of two children, Eugène and Hortense. Her husband was guillotined in 1794 by order of the Convention, and two years later she married Napoleon. Divorced in 1809 for State reasons, she retired to La Malmaison, where she passed the rest of her life.

Josephus, *Jo se' fus,* Flavius (about 37-about 100), a celebrated Jewish historian, born in Jerusalem. When 26 years of age he was chosen a delegate to Nero, and when the Jews made their final revolt against the Romans, though he vainly tried to dissuade them, he accepted the appointment of governor of

Galilee. After the capture of Jerusalem (70 A. D.), by Titus, Josephus went to Rome, where he devoted himself to literary studies. He wrote, in Greek, a seven-volume *History of the Jewish War; Jewish Antiquities,* which, in 20 volumes, gives the history of the Jews from the earliest time to the reign of Nero; and an *Autobiography.*

Josh Billings. See SHAW, HENRY WHEELER.

Joshua, *Josh' u a,* the sixth book of the Bible and the first of the historical group; also the name of the author of this book. Joshua was the son of Nun, of the tribe of Ephraim, and was set apart to be the successor of Moses in the leadership of the Israelites. He led the people into the Promised Land, defeated their enemies, divided the land and set up the Tabernacle for the institution of public worship, dying at Timnath-Serah in Mt. Ephraim, at the age of 110 years. The book of *Joshua,* embracing a period of 25 years, recounts the public career of this leader. See BIBLE, subhead *The Old Testament.*

Josi'ah, a King of Judah, who reigned from about 641 to 610 B. C. In the Septuagint and New Testament he is called Josias. He succeeded his father Amon at the age of eight years, at a time when great corruption prevailed. However, he proceeded to purge the land from its forms of idolatry and superstition. During the restoration of the Temple, a task which Josiah had instituted, Hilkiah the priest discovered the "book of law." This discovery stimulated the King to bring to completion the work of reformation begun. Josiah died of a wound received at Megiddo, while fighting Pharaoh Necho.

Joule, *Joul,* the practical unit of work or energy in the metric system, and equal to the work done by a power of one watt acting for one second. It is sometimes called a watt second. The value of a joule in the English system is .7373 foot pound. See ERG; KILOWATT HOUR.

Joule's, *Joulz,* **Law,** a law relating to the heat developed by an electric current in a conductor and named after the English physicist, James Prescott Joule (1818-1889), who first established it. The law states that the heat generated in a conductor is proportional to the time the current flows, to the resistance of the conductor and to the square of the current. In mathematical form, the quantity of heat H equals .24 C^2Rt, where H is expressed in calories, the value of the current C is expressed in amperes, the resistance R in ohms and the time t in seconds.

Journalism. See NEWSPAPER.

Juan de Fuca, *Hwahn' da Foo' kah,* a passage connecting the Pacific Ocean with Puget Sound on the south and the Strait of Georgia on the north. It lies between Vancouver Island and the State of Washington, has a length of 100 m. and a width of about 15 m. It contains several small islands.

Juan Fernandez, *Hwahn Fer nahn' dathe,* a group of islands in the South Pacific Ocean, a possession of Chile, from the coast of which it lies about 350 m. distant. The three islands are Juan Fernandez, or Más-á-Tierra; Más-á-Fuera and Santa Clara. They are of volcanic origin, and their fertile soil is favorable to the raising of grain and fruit, but the population numbers less than 100. In 1574 Juan Fernandez discovered the islands, and they were long the resort of buccaneers. Alexander Selkirk lived here in solitude between 1704 and 1708, and from his life Defoe is supposed to have gained material for his *Robinson Crusoe.*

Ju'dah, Kingdom of, the name applied to the southern division of the monarchy after the death of Solomon, about 937 B. C. The ten northern tribes revolted under the leadership of Jeroboam and established the Kingdom of Israel (See ISRAEL, KINGDOM OF). Strictly speaking, Judah was but a continuation of the kingdom of Saul and David, though Rehoboam, Solomon's successor, had to suffer the loss of over half his kingdom. Of the 20 kings who occupied the throne of Judah after the separation, only seven "walked in the ways of David." In 586 B. C. the capi-

tal city, Jerusalem, was captured and destroyed by Nebuchadnezzar, and the people carried away captive to Babylon. This event marks the end of the Kingdom of Judah as an independent state.

Judaism, *Joo' da iz'm,* the name by which the religion of the Jews prior to the Christian Era is designated. Its sacred books are those of the Old Testament. It is monotheistic (belief in one God) and based upon revelation. Judaism has a priesthood and extensive sacrificial system based upon the idea of atonement for sin. After the period of wandering had passed and Jerusalem became the center of Jewish national life, the Temple of the Hebrews was the center of their religious service and the Holy of Holies back of the altar was the most sacred place of all. Into this Holy of Holies the high priest went once a year to make atonement for himself and all the people. This sacrificial system was typical of the sacrifice that the Christ was to make in his bodily death, for the whole world, once for all. This system, and the Mosaic Law, based upon the Ten Commandments, constitute the most prominent features of Judaism.

Ju'das Iscar'iot, one of the Lord's Twelve Apostles, the betrayer of his Master. We know little of his special characteristics, but from the fact that he was the treasurer of the band, we may conclude that he was regular in attendance on the ministry of Jesus and of a practical turn of mind. His betrayal of our Lord for 30 pieces of silver and subsequent suicide because of remorse form a tragic episode of Bible history.

Judd, Orange (1822-1892), an American farmer and journalist, born in Niagara Falls, N. Y. He graduated from Wesleyan University; taught school three years; became editor and publisher of the *American Agriculturalist;* served as the agricultural editor of the New York *Times;* from 1863 to the end of the war was sanitary commissioner of the Army of the Potomac. From 1883 to 1888 he edited in Chicago the *Prairie Farmer,* which became the *Orange Judd Farmer.* He donated Orange Judd Hall of Natural Sciences to Wesleyan University, and it was largely through his efforts that the first state agricultural experiment station was established, at Middletown, Conn., 1875.

Judea, *Joo de' ah,* the name of the Jewish kingdom established by the Maccabees in Palestine. Later, under Roman domination, the name was applied to the southern division of Palestine, as the name Samaria was to the northern division. Its other boundaries were: upon the east, the Dead Sea; upon the south, Arabia; and upon the west, the Mediterranean. See PALESTINE.

Jude, Epistle of, the name of one of the General Epistles of the New Testament. Of the writer of this Epistle, next to nothing is known. It was probably written not far from A. D. 90 (Bacon). The letter denounces certain heresies of the Simonians, the Nicolaitans and the Gnostics, which were creeping into the Church. Jude exhorts "them that are sanctified" to build themselves up in faith by praying to the Holy Ghost. The letter is generally accepted as genuine by the Church at large.

Judges, the second historical book of the Old Testament. Covering a period of about 300 years, it chronicles the decline of Israel, after the death of Joshua, into a state of political anarchy and religious backsliding. The book is so named because the narrative is mainly occupied with the history of the judges who were called to deliver and govern the Israelites. The authorship is uncertain, but is ascribed by Jewish tradition to Samuel. See BIBLE, subhead *The Old Testament.*

Jugo-Slavia, also called the kingdom of the Serbs, Croats and Slovenes, a Slavic nation, nearly parallels Italy, to the east of the Adriatic, extends from Austria on the northwest to Bulgaria and Greece on the southeast. Its greatest length is about 575 miles; width, 150 miles. Its estimated area is about 85,000 square miles. It is the country of the Southern Slavs (Jug means south) separated from their ethnic brethren, the Czecho-Slovakians, by the non-Slavic

people of Austria and Hungary. The estimated population of the united country is between eleven and twelve million. The king of Serbia is king of the United country but it is not a "Greater Serbia" since the several provinces are independent in local affairs.

The People. In accordance with the principles of nationalism now prevalent in the world, Jugo-Slavia was formed by the voluntary union of subject Slavic provinces, formerly a part of Austria-Hungary; and the independent countries of Montenegro and Serbia. From Austria-Hungary came the southern parts of the old provinces of Carinthia and Styria; all of Carinola, Croatia, Slavonia, Bosnia-Herzegovina and parts of Dalmatia. These people are all distinctly Slavic in ethnology. Their languages present only dialectical differences; they have much of history in common; they formed a closely united people in the eleventh century of our era; they became separated by reason of political and economic causes, accentuated in course of time by the adoption of different religious faiths,—the Catholic, Greek, and Mohammedan; the adoption of different alphabets,—the Roman and the Cyrillic; and for long centuries they were under the rule of different nations,—Austria, Hungary, and Turkey.

The Country. Jugo-Slavia is a country of great scenic attraction. The Dinaric Alps parallel the Adriatic and there are many minor ranges throughout the country. Montenegro is a distinctly mountainous province, and is the one country of Jugo-Slavia whose people retained their independence, never having been conquered through the centuries of history. There are two important river valleys,—that of the Save in the north and Morava in Serbia which with numerous tributaries carry the waters of the country to the Danube. The valleys are uniformly fertile, the mountain ranges and hills are forested. The people are agricultural in their habits, tilling with care their fields, even carrying soil from the valleys to make fertile terraces on the hills. They are not, by preference, a manufacturing or mercantile people, but Jugo-Slavia possesses abundant water power and great forest and mineral wealth. They can now devote their energies to the development of their own country unhindered by foreign masters.

History. The people that compose the kingdom of Jugo-Slavia came into the Balkan Peninsula in the seventh century of our era. The Slovenes settled in the northern end of the West Balkan territory; the Croats settled in the northwestern half of the territory, to the south of the Slovenes; the Serbs, roughly, in the southeast part of it. They have remained in these sections to the present time. The Slovenes were conquered by the German (Austrian) forces and became a possession of the Archduchy of Austria in the eighth century. The Croats, on the Save, came in contact with Roman civilization and adopted the religion and letters of Rome. Croatia became a part of Hungary in 1102 and with that country became a part of Austria-Hungary in 1527. After 1866 it was ruled by Hungary.

The Serbs to the southeast of the Croats expanded to the south and adopted the religion and alphabet of the Byzantine Empire. In the thirteenth century Serbia was a powerful country; in 1350 their great leader, Dusan Silni, was styled the "Czar of the Serbs, Bulgars, and Greeks." But this period passed, and all of the Balkan Peninsula except the territory of the Slovenes, Croats, and Slavonians in Austria-Hungary—and of course Montenegro—passed under Turkish control after the battle of Kossova, 1387, and remained provinces of that woefully misgoverned country for centuries. During these centuries of separation—a thousand years—with their differing political and cultural tendencies, these Slavic people never lost the instinctive feeling of unity. This feeling was strengthened by the literary activity of Slavic poets and writers and the work of religious leaders so that when the downfall of Austria-Hungary took place late in 1918, political union

came as a perfectly natural result. (See the provinces of JUGO-SLAVIA under their respective titles.)

Judson, Harry Pratt (1849-), an American educator, born at Jamestown, N. Y. He graduated at Williams College in 1870, and for the next 15 years was a teacher and high school principal at Troy, N. Y. From 1885 to 1892 he was professor of history in the University of Minnesota. He served as professor of political science in the University of Chicago from 1892 to 1907, in 1906 becoming acting president. Since 1907 he has been president of the university. Among his works are *Europe in the Nineteenth Century, The Essentials of a Written Constitution, The Growth of the American Nation,* and *The Government of Illinois.*

Jugur'tha (?-104 B. C.), King of Numidia, whose history is written by Sallust. He killed his cousins, associated with him in government, seized the power and bribed the commissioners and generals sent against him by Rome. At last Marius was placed in command of the Roman army, and Jugurtha was defeated and taken prisoner to Rome, where he died of starvation in a dungeon.

Julian, *Jool' yan,* (331-363), a Roman emperor and the nephew of Constantine the Great. His name in full was Flavius Claudius Julianus. He was usually called the Apostate because, though brought up in the Christian faith, his philosophical studies led him to turn with devotion to the old paganism of Athens. Under the direction of his cousin Constantius, the successor of Constantine, Julian forsook his literary pursuits to drive the Germans across the Rhine. So popular did he become among his soldiers that Constantius' jealousy was aroused; this did not prevent Julian's legions from acknowledging him as their emperor, but Constantius' death at this time brought a solution of the difficulty. Julian's reign was unique in that he attempted by peaceful means to restore the old pagan religion modified by the later philosophy.

Junco, *Jung' ko,* a bird of the Finch Family. The junco, or snowbird, with its slate-gray head and back and the white under parts, is better known to the majority of people in the winter when most of the bird life has migrated to warmer climes. Juncos are sprightly little birds, congregating in large flocks and frequently mingling with the English sparrow in dooryards, when the snow has covered the fields and temporarily cut off the supply of seeds. The junco may be easily distinguished by its size, which is about equal to that of an English sparrow, and by the white outer tail feathers, which are spread out in flight. These birds breed in the North, building their nests among the roots of fallen trees, in bushes or on the ground concealed in underbrush. Three to five brown-speckled eggs are laid.

JUNCO

June, Jenny. See CROLY, JANE CUNNINGHAM.

June Berry, Service Berry or **Shadbush,** one of the early-blooming shrubs or small trees of the Rose Family, found in damp woods and moist ground throughout eastern United States and as far west as the Mississippi. Its grayish-red branches are generally about 10-12 ft. in length, though under favorable circumstances the bush may become a tall tree. These branches bear woolly-stemmed leaves with pointed or rounding apexes and finely-toothed margins. The white, terminal sprays of flowers have a delicate appearance due to the long, narrow petals. The fruit is a round, juicy berry, sweet to the taste and almost as ornamental as the flowers.

Its early-ripening fruit has given it its common name, which in the South is sometimes changed to May berry. The name shadbush is given it in the river and lake districts where its flowers appear when the shad "run."

June Bug, or **May Beetle,** a harmful beetle of the Scarabæid Family. The larvæ are the fat, white, horny-headed "worms" found about the roots of grasses and plants or lying in decaying wood. These develop into the big, brown or black nocturnal beetles, which are familiar east of the Rockies, and which do great damage to the foliage of fruit and shade trees. They come flying in at an open window at night and buzz about a room in a disagreeable manner. Their six legs are long and hairy, their antennæ short and bent and the eyes wide apart. The larvæ are destructive to lawns. See COLEOPTERA; INSECTICIDE.

Jungfrau, *Yoong' frou",* a mountain peak of Switzerland, in the Bernese Alps. It rises between the cantons of Bern and Valais, 8 m. w. of the Finsteraarhorn, and extends upward, steeply on the east and north, to a height of 13,670 ft. Pure, white snow covers its summit, and this together with its magnificent and slender form has occasioned its name. Two Swiss gentlemen made the first ascent in 1811. An electric railroad passing through a six-mile tunnel in ascending it to its summit, was completed in 1903.

Ju'niper, sometimes called red cedar, a member of the Pine Family, generally found as a spreading shrub but in some localities attaining the dimensions of a tree. It grows on waste ground and rocky hillsides in England, and in the United States as far west as the Rockies. Common juniper is a low shrub, with twisted branches bent along the ground, and, from a distance, is decidedly ornamental. The leaves are small, with awl-shaped points, green underneath but having a whitish bloom above, which gives them a blue appearance. They always occur in whorls of three. The female flowers are merely a cluster of pistils from which later a red or blue-black berry matures. The juniper has a tough, scaly stem, in which the bark is separated from the woody layer by a resinous, gummy structure, rendering it easily stripped. The juice is bitter and lasting, making the berries unpleasant to the taste. The wood is fine-grained and used in cabinetwork, inlaying and for making pencils and cigar boxes. Some varieties of juniper are poisonous and some, in Virginia and the Mediterranean regions, are large trees.

Junius, *Joon' yus,* the pen name of a writer who contributed a series of articles to the London *Public Advertiser* from Jan. 21, 1769, to Jan. 21, 1772. When they appeared they aroused great interest because of their attacks on the ministry of the Duke of Grafton, as well as because of their style and the mystery connected with their authorship. They were full of personal abuse, often without foundation and frequently, too, lacking in logic and insight. About 40 men, prominent in politics and letters, were suggested as the author, and the decision finally settled (without sufficient evidence) on Sir Philip Francis. Henry S. Woodfall was the editor of the periodical in which the letters appeared, and he afterwards collected and published them in one volume.

Junk, a sailing vessel common in Eastern waters, and used especially by the Chinese and Japanese. It is flat-bottomed, with square bows, a high, full stern and a very large rudder. Although the junk presents altogether an ungainly appearance, below the water line it is often finely modeled. Most of the larger junks are such excellent sea boats that they ride out severe typhoons in safety. Many have a single, large mast, with one or more smaller ones; but others have two masts of about equal size. The sails are of coarse cloth or matting, often stiffened by small poles of bamboo. They are usually built to carry several hundred tons.

Ju'no (in Greek, Hera), in classic mythology, wife and sister of Jupiter and queen of heaven. Her domestic relations were unhappy, since Jupiter was

unfaithful and menacing and she was jealous and sharp-tongued, and was obliged to spend most of her time seeking revenge on the mortal wives and offspring of her spouse. Dignified and matronly, Juno was attended by Iris, who was her messenger. The cuckoo and peacock were sacred to her, as were the

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willow, pomegranate and lily. Presiding over marriage, she was particularly worshiped by women, her chief shrine being at Argos, Samos and Platæa, where kine, ewe-lambs and sows were sacrificed to her.

Ju'piter, the largest planet of the solar system and the fifth from the sun. Its mean distance from the sun is over 480,000,000 m.; its mean diameter is about 87,000 m.; its size is equal to about 1300 earths, but it is not so dense as the earth, and its mass is equal to only about 316 earths. Jupiter's day is 9 h., 55 min., 20 s.; its year is nearly 12 of our years. It moves through its orbit with a velocity of 483.6 m. per minute, or about four and one-half times the velocity of the earth. Next to Venus, Jupiter is the brightest planet and is easily seen with the naked eye. It is morning star for six months of the year and evening star for the other six months. When viewed through a large telescope, broad parallel bands are seen extending around the planet parallel with its equator. These bands have a brownish-red appearance and are constantly changing. This changing appearance and the lightness of the planet have led astronomers to conclude that Jupiter is still in a highly heated state and that much of the matter comprising it is molten or gaseous.

Jupiter has eight satellites, which, with the planet, constitute a miniature solar system. Four of the satellites can be seen with a telescope of moderate power, but for the observation of the others a powerful telescope is required. The first satellite, or the one nearest the planet, makes a revolution in its orbit in two days; the second, in four days; the third, in seven days; and the fourth, in 17 days. See PLANET; SOLAR SYSTEM.

Jupiter (in Greek, Zeus), eldest son of Saturn and Rhea, ruler of heaven, "father of men and gods," whose power was supreme and whose word was fate. Of his many wives, he swallowed the first, Metis, to prevent the fulfillment of the warning that his first child would equal him in wisdom and strength. Later, Minerva leaped from his head. Subsequently he married the divinities Themis, Eurynome, Ceres, Mnemosyne, Latona and Juno, besides the mortals Alcmena, Antiope, Callisto, Danaë, Europa, Leda and Io.

He counted among his children the Fates, the Graces, the Muses, Proserpine, Apollo and Diana, Mars and Hebe, as well as many celebrated warriors. The oak and eagle were sacred to Jupiter. The Algis, his shield which emitted thunder, lightning, darkness and fear, was fashioned by Vulcan. Dodona was his great oracle.

Ju'ra, a mountain range in central Europe. The main range begins in the southeastern part of France, forms the western boundary of Switzerland, into which country it finally passes, and ends on the south bank of the Rhine. It is about 200 m. long and from 20 to 35 m. wide; its height ranges from 3000 to 5000 ft. The lofty summits of its peaks, covered with snow through a large part of the year, the steep and black gorges, and the forest-clad slopes form an extremely picturesque landscape. In the valleys, agricultural pursuits are carried on. The mineral products gained from the mountain depths are principally gypsum, salt and lithographic stones.

Ju'ry, in English law a body of laymen summoned and sworn to ascertain, under the direction of a judge, the truth as to questions of fact in legal proceedings, whether civil or criminal, and to give a verdict in strict accordance with the evidence presented. The exact origin of the jury system is not known with certainty, but the methods are not unlike the early trials in England, which were derived from the Norman institution of recognition by sworn inquest. The King's Court directed the sheriff to select four knights, by whom 12 knights were selected to act as recognitors, whose duty it was to inquire into matters subject to public inquiry. The development of the recognitors into the common-law jury gradually followed.

Grand Jury. This jury consists of persons drawn from the same class as the ordinary, or petit, jurors. This number is fixed by usage at not less than 12 nor more than 23. Unanimity is not required, but 12 must concur in the presentment or indictment. After a formal charge of the judge all indictments are submitted to the jury. Each indictment is then taken up separately and the evidence upon which it was made is presented by the prosecuting attorney. If the evidence is sufficient to warrant the indictment, it is sustained and reported as a true bill against the accused, who is held for trial before a petit jury. If the indictment is not sustained the accused is discharged. It is also the custom of the grand jury to make report to the court on such matters as seem to them of public interest.

Petit Jury. This jury is also called a common or traverse jury. The first step toward summoning a jury is the issuing of a writ or precept of a court having jurisdiction over jury trials, directed to the sheriff and called at common law a *venire facias,* meaning cause to come. This writ commands the sheriff to summon citizens residing in the county to attend a term of court for the purpose of serving as jurors. The jurors thus summoned are said to be impaneled, the name being derived from the sheriff's panel, or parchment, containing the list of jurymen. The clerk of the court draws the names of the jurymen by lot, and each man takes his seat in the jury box as his name is called, until 12 are chosen. The parties to the action or their attorneys have the right to challenge each juryman called until a certain number have been challenged by each side. In critical cases the exercise of this right frequently makes it necessary to call a large number of men before a jury is obtained. After the jury has been drawn, the members are sworn and the trial begun. Petit juries are required in the trial of all criminal offenses and of all issues of fact in civil cases under the common law.

Coroner's Jury. This so-called jury is summoned to inquire into cases of violent or sudden death. This jury varies in size from 6 to 23 members. The functions of this jury consist in determining the cause of the death. If it was by an accident due to a public conveyance, they may recommend means of preventing similar accidents.

Jussieu, *Zhu" syu',* **Antoine Laurent de** (1747-1836), a French botanist noted for originating the present natural system of a classification of plants as opposed to the artificial system of Linnæus. He was successively professor of botany at the Jardin du Roi and Jardin des Plantes. His *Genera Plantarum,* and his articles for the *Dictionary of Natural Science* and *Annals of the Museum* are still valuable in botanical literature.

Justice, Department of, one of the nine executive departments of the United States Government, at the head of which is the attorney-general. The office of attorney-general was created when Washington organized his first cabinet, but the department of justice was not established until 1870. It is the duty of the department of justice to look after the legal affairs of the United States; to represent the government in court when necessary; to supervise the reformatory and penal institutions of the government; to administer the national bankruptcy law and, when required, to revise and codify the Federal laws. The attorney-general is also required to advise the president when called upon and to furnish written opinions upon matters pertaining to his department. The attorney-general has two assistants; when temporarily absent the solicitor-general acts in his stead.

Justice of the Peace, a minor official having both administrative and judicial functions. In England, justices of the peace are appointed by commission of the Crown or by act of Parliament to exercise a certain limited authority in a county or borough. In the United States the office is held either by appointment or election, and the justice of the peace is paid by a system of fees assessed against those requiring his services. The state or county remunerates him in criminal hearings. In states where this best serves the people there is a provision for three or four justices in each township. A justice of the peace also presides over the justice court, which has jurisdiction over civil cases of little importance involving small amounts. This court is easily reached, and local cases may be adjusted without resort to higher tribunals. The justice of the peace may preside at preliminary hearings in criminal cases, but his jurisdiction extends only to binding over the accused to the grand jury (See JURY, subhead *Grand Jury*). In some states a justice has a right to perform the marriage ceremony.

Justin'ian (483-565), the ablest Roman emperor of the East. He was probably of Slavic origin, and went early to Constantinople, where he received a good education. He became associated with his uncle, the Emperor Justin, and succeeded him at his death. He was noted for his legal reforms, his Church policy and his successful wars. He had the laws and decrees of the emperors collected, and under the supervision of his great lawyer, Tribonian, he published the *Digest,* or the laws proper based upon the opinions of the lawyers of the past; and the *Institutes,* a sort of textbook for the study of Roman law. This work was of incalculable value, as the laws of Rome were thus preserved and have become the basis of European jurisprudence. By his happy choice of good generals such as the skillful Narses and the dashing Belisarius, he was able to regain Africa from the Vandals, Italy from the Ostrogoths, and even a part of Spain from the Visigoths. He also kept out the Germans and Huns on the frontier, but was less successful against the Russians.

Justinian Code. See LAW, subhead *Justinian Code.*

Jute, *Joot,* a textile fabric obtained from the bark of two similar tropic plants of the same family as basswood, which grow to a height of from 12 to 14 ft. The plant is a native of India and is cultivated extensively in Bengal, where the natives have woven its fiber for centuries. It is easily cultivated, is an annual crop and produces the cheapest fiber known, but soon exhausts the soil. To obtain the fiber, the plants are cut near the ground, tied in bundles and steeped in water. The bark is then easily peeled off and beaten to separate the fiber. The

chief product of jute is gunny bags, but cordage and gunny cloth are also manufactured from it. An inferior quality of coat lining is made from jute and silk, and a kind of carpet is woven from it.

Jut'land, a peninsula of northern Europe, forming the Continental part of Denmark. The Skagerrak, the Cattegat and the North Sea surround it on three sides, and Schleswig bounds it on the south. The total area, with adjacent small islands, is 9765 sq. m., making it about the size of Vermont or New Hampshire. The low surface is sandy and monotonous, and only within recent years have efforts been made to reclaim the land for forest reserves and agriculture. Cattle raising and dairying represent the principal occupations of the people; among the agricultural products are rye, oats and barley. Jutland was once inhabited by the Cimbri and was known as the Cimbric Peninsula. Population, about 1,125,000.

Ju'venal, a Roman satirist, born in the Volscian town of Aquinum, probably about the middle of the first century. His full name was Decimus Junius Juvenalis. It is taken for granted that he was a youth in the reign of Nero, was writing in that of Domitian (81-96) and survived into the reign of Hadrian (117-138). Of his personal history, all that is known is that he publicly recited some of his works. His extant writings are 16 satires. They are composed in hexameters, and with great indignation attack tyranny, corruptions of life and taste and the degeneracies of societies. Their humor is scornful and austere, but pungent, and they are priceless as somber pictures of Roman life of the empire. Juvenal has been better translated than almost any of the other ancients. A complete translation of his works has been made by Gifford. Dryden made versions of five selections. Dr. Johnson's imitations of two appear under the titles *London* and *The Vanity of Human Wishes.*

Juvenile, *Joo' ve nil*, **Court**, a court for trying the cases of juvenile offenders. The maximum age at which offenders may be tried in the Juvenile Court varies in different states, but it never exceeds 20 years. The theory underlying the administration of justice in the Juvenile Court is that children are not criminals and that they should be reformed, educated and trained for citizenship instead of being punished. Courts of this sort have been established in all of the large cities of the United States and in many foreign countries. Usually one of the regular judges of the city or county court is assigned to the Juvenile Court. He is given great latitude in dealing with the cases that come before him, and before rendering a decision often investigates the child's home life and other surroundings. Most offenders are placed on probation, each one being placed in charge of some adult who agrees to be responsible for the child's conduct. Probationers are required to report to the judge at regular intervals, and a record is kept of their conduct, occupation and time spent in school until they are discharged.

In some states the judge has power to compel those responsible for the care of the child to better his surroundings, and to prosecute those who cause the child to become delinquent. Social settlements, child-welfare associations and many citizens who are interested in the welfare of the children cooperate with the court in bringing about desired reforms relating to child life, and through their combined influence much remedial legislation has been secured. The first Juvenile Court was opened in Chicago July 1, 1899, but the most famous court of this sort is that founded by Judge Benjamin B. Lindsey of Denver, Colo., in 1901. This court has become a model that has been copied in many countries of the world. See LINDSEY, BENJAMIN BARR; SOCIAL SETTLEMENTS.

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KABUL, *Kah' bool,* or **Cabul,** the capital of Afghanistan, on the Kabul River, a tributary of the Indus. It is situated in a plateau of the Western Suleiman range nearly 300 m. n.e. of Kandahar and 150 m. w. of Peshawar, India. The city has few important or even interesting buildings, with the exception of the Ameer's mint, but is rapidly becoming a modern commercial center because of its trade in fruit, ammunition and small arms. The mud and brick walls and the old fort, Bala Hissar, that once defended the city, are now in ruins. Kabul is the key of northern India commanding the passes of the Hindu Kush. Population, 60,000.

Kadiak, *Kahd yak'* **Island,** an island situated east of the Peninsula of Alaska. It is 100 m. long and 60 m. wide. Its surface is mountainous, not well fitted for agriculture and covered with low forests. The salmon fisheries are abundant. Population, estimated at 2000.

Kafir, *Kah' fer,* or **Kaf'fir,** a native race of East Africa. The name is often applied to any of the negro families in Africa. The type varies from the pure negro in that the head is more like that of the European and the complexion shades into a clear, light brown. The contour of the face is like the negro, rather than the European, type. The hair is woolly and the lips are full. Their religion is ancestor worship, but they have not developed any ceremonies. Agriculture and manufacturing are carried on among them on a small scale. Cattle raising is the common occupation.

Kafir Corn, a variety of Indian millet, a member of the Grass Family, used extensively as a food in South Africa. The seeds are borne in graceful sprays like those of the sorghum, rather than like those of Indian corn. It is planted in hills or sown broadcast and yields a large amount of seed. Because it resists drought and cold better than Indian corn, it has been introduced into Kansas, Oklahoma and other dry states, and at present about one and one-half million acres are given up to its cultivation in the United States, where both the grains and stalks are used as fodder.

Kaiser Wilhelm Canal. See KIEL CANAL.

Kalahari, *Kah" lah hah' re,* **Desert,** a great desert of southern Africa lying between the Zambesi and the Orange rivers and at an altitude of from 3000 to 5000 ft. above the sea. Although the entire region is almost wholly destitute of water, the surface is covered by a dry, coarse grass, such as thrives in slowly-drying salt marshes. Salt basins occupy large areas and sand dunes are found along the border. The desert is inhabited only by stray bands of Bushmen and Bechuanas. Various animals of the tropical regions are found here, including the giraffe, lion and leopard.

Kal"amazoo', Mich., a city and the county seat of Kalamazoo Co., 143 m. w. of Detroit, 60 m. s.w. of Lansing and 49 m. s. of Grand Rapids, on the Kalamazoo River and on the Michigan Central, the Lake Shore & Michigan Southern, the Grand Rapids & Indiana, the Grand Trunk, the Kalamazoo, the Lake Shore & Chicago, the Chicago, Kalamazoo & Saginaw and branch lines. The Michigan United Traction Company gives interurban electric service to Detroit, Grand Rapids and other cities. Kalamazoo is in the center of the richest agricultural district of Michigan, the principal products being celery, peppermint, grapes, fruit and grain. The city's location is attractive, broad avenues of elms, oaks and maples leading from the manufacturing district along the river, over the surrounding hills, where most of the handsome residences are located.

There are numerous parks and an extensive boulevard system. Numerous educational and state institutions lend to the city's architectural features, besides which the Y. M. C. A., armory, hotels, banks, fraternal clubhouses and business houses are noteworthy. There are 42 churches, of which St. Augustine's contains a valuable art collection.

The educational institutions include Western Michigan Normal School, a training school for teachers; Kalamazoo College (Baptist), the oldest college in Michigan; Nazareth Academy (Catholic) for girls; Barbour Hall (Catholic) for boys; a number of art schools and business colleges, a public library, manual-training and vocational high schools and an Academy of Medicine. Among the benevolent institutions are Borgess and Bronson hospitals, the Children's Home and the Boys' Farm, Wilbur Home and St. Anthony's School for the Feeble-Minded, several public and private sanitariums and the Kalamazoo State Hospital for the Insane.

Celery growing, by which the city is perhaps best known, represents an annual production of about $300,000.00. Paper making is the leading industry, Kalamazoo being the book-paper center of the world, with an annual output of 183,000 tons. The investment in paper mills amounts to $16,000,000, and there are numerous plants making playing cards, tablets, blank books, parchment, envelopes and boxes. Metal-working industries are of next importance, engines, boilers, farm implements, stoves, trolley wheels, gas lights and heaters, automobiles and accessories, tanks, windmills and foundry products being manufactured in large quantities. Other products of importance are vehicles and sleds, folding boats, fishing tackle, mandolins, corsets, clothing, fraternal regalias, signs, caskets and pharmaceutical supplies. The city is the commercial and financial center of southwestern Michigan, and in freight and express tonnage ranks second in Michigan. The Kalamazoo River furnishes an abundance of cheap water power.

The first settlement was made in 1829 by Titus Bronson of Connecticut, the name being derived from the Indian, "Ki-Kalamazoo." It was incorporated into a village in 1843 and chartered as a city in 1844. Population in 1920, 48,858.

Kalb, *Kahlp,* **Johann,** Baron de (1721-1780), a distinguished German-American soldier, born in Bavaria. In 1743 he entered the French army and by 1761 had become a brigadier-general. In 1768 he acted as a secret emissary of the French Government to America and made a favorable report of the American cause. In 1777 he joined Lafayette's expedition to America. He arrived in April and in September was commissioned a major-general, with command of the Maryland division of the Continental army. For the next three years he served with honor and reputation, was second in authority to Gates in the South and commanded the American right wing at Camden. In this battle he was mortally wounded, and died three days later. He was buried at Camden.

Kaleidoscope, *Ka li' do skope,* an optical toy by which a large variety of symmetrical designs are obtained. It consists of a tube containing three glass mirrors arranged to form a hollow triangle and extending its whole length. One end of the tube is closed, except for an eyepiece, while at the other end there are two plates, one of ground glass, the other of clear glass, with the latter nearer the eyepiece. Between these two glasses are a number of bits of colored glass, beads and like objects, which form a different figure each time the tube is revolved. A modification of this device is extensively used by designers for making patterns for calicoes and wall papers.

Kalevala, *Kah' la vah" lah,* a celebrated Finnish epic. The ancient popular songs of which the poem is composed were first collected in the early part of the 19th century, but the present form of the poem is the work of Elias Lönnrot, who wrote down the songs exactly as he heard them in his travels among the peasantry. Two editions have appeared, in 1835 and 1849

respectively. The epic, which contains 22,793 lines, is in eight-syllabled trochaic verse. It is alliterative, but there are no rhymes. Longfellow's *Hiawatha* is similar to this poem in style.

Kal'mia, often called American, or mountain, laurel, an evergreen shrub of the Heath Family, found in the Northern and Middle states. The various species grow from 1 to 20 ft. in height and are especially ornamental when in bloom. Along the hillsides or mountains in the South the bush often grows in dense, shrubby groves. The leaves are long-oval in form, and their color is bright green on both sides. The flowers grow in snowy clusters and are white, pink or purple in color, sometimes having crimson streaks or spots. The shrub is frequently used in parks because of the beauty of the blossoms and the denseness of the foliage. The individual flowers have widely-opened, five-divided corollas, to which the stamens adhere closely. When insects enter the blossoms to secure the honey the petals bend so far that the stamens fly back, and thus the fertilizing dust is discharged upon the pistil.

A less commonly known species of kalmia grows in swamps of the North and has longer, pale leaves, which are almost white underneath, and pale-lilac flowers. Known as the mountain laurel, the blossoms are the state flower of Connecticut.

Kal'mucks, a nomadic people living in central Asia, China, Siberia and European Russia. The Kalmuck Steppe is a reservation in Astrakhan to the west of the Caspian Sea. About 130,000 persons live here in over 27,700 tents. The total number of Kalmucks is about 700,000. They are excellent horsemen, and breed horses, cattle and sheep. The Kalmucks are a small, warlike people, their shoulders are broad, their heads round, their eyes narrow and oblique and their hair shaggy. Lamaism is their religion.

Kamchat'ka, or **Kamtchatka,** a peninsula of northeastern Asia dividing Bering Sea from the Sea of Okhotsk. It is 750 m. long and varies in width from 80 to 300 m. The isthmus connecting the peninsula with the mainland is a gently-sloping tundra, but the peninsula itself is mountainous and has many extinct and active volcanoes. There are large deposits of copper, mercury and iron ores, sulphur, ocher and amber. The climate is not especially pleasant. Dense fogs are frequent, but for this reason vegetation is rich and forests abound. The summers are damp and cold but the winters are not severe. The natives are probably a branch of the Mongolian race; their chief pursuits are hunting and fishing. The walrus and sea lion are found upon the coasts. Population, 35,800.

Kamerun, *Kah" ma roon',* a former German protectorate on the Gulf on Guinea, Africa, now under the joint mandate rule of France and Great Britain. It is an odd-shaped country, having a little more than 200 m. of coast and stretching 800 m. inland to Lake Chad. Its extent is estimated at 191,000 sq. m. The country is crossed by the Kamerun Mountains, a range of moderate height, but elsewhere is chiefly plateau. Cattle raising and the production of coffee, tobacco, cocoa and India rubber are the principal occupations. Buëa is the capital. Population, about 2,303,000.

Kane, Elisha Kent (1820-1857), an American physician and Arctic explorer, born at Philadelphia. In 1850 he went in search of Sir John Franklin with the Grinnell Expedition, and left New York City in 1853 in the *Advance* for further exploration of the polar regions. Kane made himself famous by his popular accounts of the expeditions and the regions visited. He was made a member of the Royal Geographic Society, and received medals from a number of scientific bodies in Europe and America. See POLAR EXPLORATIONS.

Kan"garoo', a large family of Marsupials, native in Australia and remarkable for their awkward bodies, which seem to be overdeveloped in regard to hind limbs. The young are born in a

very immature state and are then placed by the mother, either by means of teeth or forepaws, into the pouch, which is formed on the abdomen by a fold of the skin. Here they are nourished until they are able to shift for themselves.

The head of the kangaroo is much like that of a deer. Its forelegs are short and are used more like weak arms than like legs, although the kangaroo does sometimes travel upon "all fours." The hind limbs are long and powerful,

KANGAROO

and the feet show an especial elongation, so that the animal, with the aid of its strong tail, may rest upright. Its ordinary method of traveling is by long leaps, for which its strong hind limbs are especially adapted. Kangaroos are generally found in herds, and the males of the herd, in bush nomenclature, are called "old men," the females, "flying does," and the young are "joeys."

There are many specimens of kangaroos, which vary greatly in size but little in habit. The rat kangaroos are more like rabbits in size and, like them, live in burrows; the musk and the dorca kangaroos live in trees; the wallabies are the mountain dwellers; the largest of all is the red, or woolly, kangaroo. The flesh of the kangaroo is of good quality and is highly enjoyed by the Australians. The hide makes a fine quality of leather suitable for making gloves, shoes, purses and bags.

Kangaroo Rat. See JUMPING MOUSE.

Kan"kakee', Ill., a city and county seat of Kankakee Co., 56 m. s.w. of Chicago, on the river of the same name, and on the Illinois Central, the Indiana, Illinois & Iowa, the Cleveland, Cincinnati, Chicago & St. Louis and other railroads. The river furnishes abundant water power at this point, which is extensively employed for manufacturing purposes and for the generating of electricity for city lighting and for the operating of steel railways. Kankakee is situated in a fertile agricultural district, has good railroad facilities and is of considerable commercial importance. Among the leading manufactures are pianos, furniture, ornaments, sewing machines, knit goods, agricultural implements, starch, flour, nails, wire, plows, mattresses and cigars. The town has also grain elevators, foundries, carriage and wagon factories, brick and tile works and limestone quarries.

Chief among the various activities and institutions are several banks, the Eastern Illinois Hospital for the Insane, the Conservatory of Music and St. Joseph's Seminary; and at Bourbonnais Grove, a suburb of the city, Notre Dame Academy and St. Viateur's College, the latter one of the most important Roman Catholic divinity schools in the West. The principal buildings include the public library, the opera house and the building occupied by the Y. M. C. A. Several parks add to the attractiveness of the city. Settled in 1853, Kankakee was incorporated one year later and chartered in 1892. Population in 1920, 16,721.

Kansas, *Kan'zas,* THE SUNFLOWER STATE, one of the West North Central States, is bounded on the n. by Nebraska, on the e. by Missouri, on the s. by Oklahoma and on the w. by Colorado.

SIZE. The length from east to west is 400 m., the breath is 208 m. and the

area is 82,158 sq. m. Kansas is only a little smaller than Minnesota, almost exactly twice the size of Ohio, less than one-third the size of Texas and the 13th state in area.

POPULATION. In 1920 the population was 1,769,257. From 1910 to 1920 there was a gain in population of 78,308, or 4.6 per cent. There are 21.6 inhabitants to the square mile and the state's rank in population is 24.

SURFACE. Kansas is a part of the Great Plain extending from the Rocky Mountains to the Mississippi River. Its surface as a whole is rolling prairie, sloping toward the east and characterized by low swells separated by shallow valleys. Along the eastern border the altitude is about 800 ft. and along the western border it is from 3500 to 4400 ft. The surface of the prairie is varied by occasional hills ranging from 400 to 500 ft. above the surrounding country, and there are occasional bluffs of 100 to 200 ft. along the streams. In the western part of the state the river valleys are shallow.

RIVERS. The Kansas River with its tributaries, the Smoky Hill, the Solomon, the Republican and the Blue, drains the northern half of the state and enters the Missouri at Kansas City. The Arkansas drains the southwestern and south-central parts, and the Neosho drains the southeastern part.

CLIMATE. Kansas has a mild temperate climate. The summers are characterized by hot days with cool nights, the winters are short and mild and in the northern part the thermometer seldom falls below zero. The atmosphere is clear, dry and bracing, and throughout the year there are many sunny days. The mean annual temperature is 50° in the northern and 55° in the southern part. The rainfall varies from 44 inches in the east to 25 inches in the central part and 15 to 10 inches in the western part, with an average for the entire state of 27 inches.

MINERALS AND MINING. In the southern part of the state are extensive coal fields containing bituminous coal. This is mined in a number of places and the annual output amounts to about $6,000,000. Lead and zinc occur in paying quantities in Cherokee County. There is a large field of natural gas in Allen and adjoining counties, and Neosho County contains important oil fields. Petroleum is also found in adjoining counties and the annual yield for the state is about 1,000,000 barrels. In Reno and Kingman counties there are valuable salt mines, the output of salt being about 2,000,000 barrels a year. Building stone of excellent quality is found in many places, and gypsum, chalk and clay in workable quantities are widely distributed.

AGRICULTURE. About one-half the area of Kansas is in a high state of cultivation and agriculture is the chief industry of the state. In the eastern and central parts diversified farming is generally practiced, but in the western part raising live stock is the most important branch of agriculture.

Soil. On the prairies the soil is a rich loam and along the rivers it is mostly alluvial.

Products. Kansas is the leading state in the production of winter wheat, the average crop being over 100,000,000 bushels. Some spring wheat is also grown. Corn, with an average yield of 200,000,000 bushels, is the most important crop in point of acreage and value. Then follow in order of value, oats, kafir corn, potatoes, sorghum, rye, hemp, barley and millet. Buckwheat, sweet potatoes, broom corn, alfalfa, timothy and clover are all important field crops, and garden vegetables are raised in large quantities, especially in the eastern part of the state.

Kansas is an important fruit-growing state and has over 7,000,000 apple trees, over 4,000,000 peach trees and about 1,000,000 cherry trees. Plums, pears, grapes and small fruits are also raised in large quantities. The climate and soil of eastern Kansas are well adapted to the propagation of nursery stock. The greater part of the world's supply of seedling apple trees is produced in the lower valley of the Kansas River.

The adaptability of the western half of the state to grazing and the mild winters which enable stock to go without shelter make western Kansas an ideal region for stock raising. Horses, cattle, sheep and hogs are raised and marketed in large numbers. Dairying is one of the most important branches of the live-stock industry and is the source of an annual income amounting to more than $8,500,000. The income from poultry and eggs exceeds $5,700,000, and the annual wool clip is about 2,000,000 lb.

MANUFACTURES. Slaughtering and meat packing, with its chief center at Kansas City (Kansas), is the most important manufacturing industry. Next in importance is the production of flour and of gristmill products. Making and repairing railway cars, the manufacture of machinery and castings, glass and bricks, wagons and carriages, making butter and cheese, the manufacture of soap and the preparation of condensed milk are other important industries.

TRANSPORTATION AND COMMERCE. Kansas has over 10,000 m. of railway, and the eastern and central parts of the state are amply provided with railway facilities. Lines extend through the state in all directions. The most important systems are the Santa Fe, the Rock Island, the Union Pacific, the Missouri, Kansas & Texas and the St. Louis & San Francisco (Frisco System). Interurban lines are found in and about all the large cities. Kansas City, Wichita and Hutchinson are the chief railway centers.

Kansas has a large commerce. Live stock, packed meat, corn, wheat, flour, dairy products, condensed milk, fruit, agricultural produce and salt are sent to Eastern markets in large quantities. Petroleum is sent to various states and some coal is exported. Foodstuffs not raised within the state and manufactured goods are imported.

GOVERNMENT. The constitution was adopted in 1839 and it has been amended several times. One of the amendments prohibited traffic in alcoholic liquors. Woman suffrage was adopted in 1912.

The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general, superintendent of public instruction, superintendent of insurance, secretary of agriculture, and secretary of horticulture and bureau of labor and industries, all elected for two years. The Legislature consists of a Senate which cannot exceed 40 members and a House of Representatives that cannot exceed 125 members. Senators are elected for four years and representatives for two years. The sessions are biennial and practically limited to 50 days.

The judicial department consists of a Supreme Court of seven judges and District Courts having 39 district judges. The judges of the Supreme Court are elected for six years and of the District Courts for four years. There is a probate judge and a clerk of the District Court in each county. There are justice courts in townships and municipal courts in cities.

EDUCATION. The public schools are under the general supervision of a state superintendent of public instruction, and those of each county under the supervision of a county superintendent. The school system is thoroughly organized and efficient. Graded schools and high schools are found in the cities and large towns, and in the sparsely settled portions of the state the rural schools are consolidated. The state has an ample school fund derived from the sale of school lands, and the income from this is supplemented by local taxation. The state university at Lawrence is at the head of the public school system and many of the high schools are affiliated with it. There is a state normal school at Emporia with branches at Hays and Pittsburg. The state agricultural college is at Manhattan, having a branch at Hays which is connected with the state farm of several thousand acres.

The higher educational institutions not under control of the state are Baker University at Baldwin; St. John's College at Salina; Fairmont College and Friends University, both at Wichita;

Southwest Kansas College at Winfield; Ottawa University at Ottawa; College of Emporia at Emporia; St. Mary's at St. Mary's; and the University of Kansas City and Western University at Kansas City.

STATE INSTITUTIONS. The school for the blind is at Kansas City, that for the deaf and dumb is at Olathe. The state soldiers' home is at Dodge City and there is a soldiers' orphans' home at Atchison. The state penitentiary is at Lansing, the industrial reformatory is at Hutchinson, an industrial school for girls at Beloit and an industrial reform school for boys at Topeka. There is a United States soldiers' home and a Federal prison at Leavenworth.

CITIES. The chief cities are Topeka, the capital; Kansas City, Wichita, Leavenworth, Coffeyville, Atchison, Hutchinson, Pittsburg, Parsons, Lawrence, Independence, Fort Scott, Salina and Emporia.

HISTORY. Kansas, named from the Dakota word for "south wind people," was first visited by Spaniards under Coronado in 1541 and not again till 1705, when French fur traders established a station within the present boundaries of the state. Barring the southwest corner, which was received from Spain, Kansas was acquired by the United States in the Louisiana Purchase, 1803. Lewis and Clark explored it in 1804, Pike in 1806 and Long in 1819. Ft. Leavenworth was erected in 1827.

The Kansas-Nebraska Bill, 1854, gave Kansas the chance to decide for free or for slave soil. Hostile immigrants from the North and South poured into the territory, and, in the attempts to form constitutions and elect Legislatures for or against slavery, hundreds of lives were lost and prosperity was destroyed. The famous John Brown Raid occurred in 1856 (See BROWN, JOHN). After alternating periods of temporary success for each party a convention at Wyandotte in 1859 formed a constitution which prohibited slavery. It was accepted Jan. 29, 1861, and Kansas became a free state

Nearly one-sixth of the population of Kansas fought in the Civil War. Prohibition and opposition to trusts have been important state interests of recent years. Consult Spring's *Kansas* in the American Commonwealths Series.

GOVERNORS. Charles Robinson, 1861-1863; Thomas Carney, 1863-1865; Samuel J. Crawford; 1865-1869; N. Green, 1869; James M. Harvey, 1869-1873; Thomas A. Osborn, 1873-1877; George T. Anthony, 1877-1879; John P. St. John, 1879-1883; George W. Glick, 1883-1885; John A. Martin, 1885-1889; Lyman U Humphrey, 1889-1893; Lorenzo D. Lewelling, 1893-1895; Edmund N. Morrill, 1895-1897; John W. Leedy, 1897-1899; W. E. Stanley, 1899-1903; Willis J. Bailey, 1903-1905; Edward W. Hoch, 1905-1909; Walter R. Stubbs, 1909-1913; George H. Hodges, 1913-1915; Arthur Capper 1915-1919; Henry J. Allen, 1919—.

Kansas City, Kan., the metropolis of the state and the county seat of Wyandotte Co., located in the northeastern part of the state at the confluence of the Kansas and Missouri rivers, and on the Missouri Pacific, the Union Pacific and other railroads. It is separated from Kansas City in Missouri by a single street, through the center of which passes the Kansas-Missouri boundary line.

STREETS, PARKS AND PUBLIC BUILDINGS. The city has an area of about 11 sq. m. and is picturesquely located on the bluff and river bottoms of the Missouri River. Many bridges cross the river and electric surface and elevated roads connect the various sections of the city and other suburban towns. The streets are well paved, shaded by fine trees and lined with pleasing public and private buildings. Among the interesting structures are the new Carnegie library, the high school, the largest and best equipped in the state, the city hall, and the buildings connected with the various educational and state institutions. There are extensive parks, boulevards and playgrounds embracing over 160 acres and rendered attractive by constant care.

Educational Institutions. The city has an excellent system of education embracing three public high schools, 40 graded schools and a well-equipped public library. There are also a Catholic high school and a number of Catholic parochial schools in the city. The Kansas City University, the Kansas City Baptist Theological Seminary, the Western University and State Industrial School for negroes, the Medical College of the University of Kansas and the Kansas School for the Education of the Blind are among the city's other great educational institutions.

Industries. Kansas City is noted chiefly for its numerous large industrial plants situated along the banks of the Kansas, or Kaw, River, which flows through the city and empties its waters into the Missouri River near the state line. These plants make Kansas City the most important manufacturing city on the Missouri River, ranking 17th among the manufacturing cities of the United States. They include the stockyards, extensive meat-packing houses, in which nearly 12,000 hands are employed, large soap works, elevators, with a combined capacity of more than 6,000,000 bushels, and mills that make the city third in rank in flour production; there are also implement factories, machine shops, boiler works, steelworks, foundries, cotton mills, and the terminal shops for several railway systems.

History. Kansas City has been built on the site of the historic Indian village founded by the Wyandots in 1843 when they came west from Ohio. The city has many points of historic interest. The old Huron cemetery, wherein lie the bones of the noted chiefs of the Wyandots, is in the heart of the city. At the foot of Minnesota Avenue on the old Wyandot levee, Lewis and Clark landed in 1804 and unfurled the American flag for the first time. A few miles up the Kansas River are the old Secondine and Tiblow Indian ferries, the Chouteau trading posts and the famous "Four Houses," where the French traders dealt with the Indians of the plains more than a century ago, and where Gen. John C. Fremont made his headquarters while making exploration trips across the plains in the first half of the 19th century.

The city is under the commission form of government. Population in 1920, U. S. census, 101,078.

Kansas City, Mo., a city and port of entry of Jackson Co., 273 m. n.w. of St. Louis, 205 m. s.w. of Omaha and 428 m. s.w. of Chicago, at the confluence of the Missouri and Kansas rivers, and on the Atchison, Topeka & Santa Fe, the Union Pacific, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul, the Kansas City Southern, the Missouri Pacific, the Frisco System, the Chicago Great Western, the Chicago & Alton, the Wabash, the Chicago, Rock Island & Pacific, the Missouri, Kansas & Texas, the Quincy, Omaha & Kansas City, the St. Joseph & Grand Island and other railroads. A steamboat line also connects the city with St. Louis. Three railroad bridges span the Missouri River at Kansas City and many smaller bridges cross the Kansas River, connecting the city with Kansas City, Kan. In one part of the city, east of the Kansas River and south of the Missouri River, is a single street through the center of which is the Kansas-Missouri boundary line. Local and suburban transportation is afforded by over 300 m. of street railroads. Kansas City is the second city in size in the state and is noted for its beauty and commercial activity. The city controls an especially large trade in live stock, grain, packing-house products and agricultural implements. The annual pure-bred live-stock show is of great importance. Natural gas is used for both heat and lighting purposes.

Streets, Parks and Boulevards. Kansas City covers an area of about 57 sq. m., and is topographically divided into three parts. One part, known as the Hills, extends east and south. The section is of great beauty and has many handsome and stately residences. The western portion of the city includes the lowlands lying between the state line on

the west and the bluff of the Kansas River on the east. The Missouri River bottoms are occupied largely by manufactories, grain elevators and railway yards. The streets are generally wide and well paved. There are six park districts comprising over 2000 acres. The park system is divided into 19 parks, Penn Valley, Fairmont and Troost parks being among the largest. The Paseo Parkway, 250 ft. wide, extends from the north to the south through the center of the city for a distance of over two miles. The Parade is the principal playground in the middle of this parkway. Beautiful Swope Park containing 1354 acres lies south of the city.

Public Buildings. Among the noteworthy buildings are the Convention Hall, which will seat 15,000 persons, Jackson County Courthouse, Federal Building, city hall, Union Station, which is now completed at a cost of $6,000,000 and with the terminals about $30,000,000, Board of Commerce Building, the Rialto, Scarritt, Long, New York Life and New England Life Insurance buildings, Y. M. C. A. and Y. W. C. A. buildings, the Elks', Evanston Golf, Elmridge and Kansas City Club buildings, the Kupper Muehlback, Baltimore, Savoy, and Sexton hotels. There are also a number of fine banks, theaters and business blocks. There are about 221 church edifices, many of them of handsome architectural design.

Institutions. Kansas City is the seat of the University Medical College, Kansas City School of Law, Kansas City Medical College, Medico-Chirurgical College, Scarritt Training School, a public library, art school and museum, the Central, Manual Training, Westport, Lincoln and two other high schools and about 60 public and parochial schools. The benevolent and charitable institutions include 30 hospitals, homes for the aged, children's homes and an industrial home. A Methodist institutional church was opened here in 1906. The city also maintains a Juvenile Court.

Commerce and Industries. Kansas City is a great commercial center for packing-house products, flour, soap, textiles and agricultural implements. There are manufactories of hosiery and knit goods, carriages and wagons, cottonseed oil, cereals and cereal products, woodenware, funiture, leather goods, harness and saddlery, hollow-tile fireproofing, brick, cement, plaster, paints, lumber products and railroad iron. Kansas City is the center of a great agricultural region, and milling is an important industry. Kansas City is the great jobbing and manufacturing market of the entire Southwest.

History. The first permanent settlement was made in 1821 by French fur traders under the leadership of François Chouteau. What is now the business part of Kansas City was first called Westport Landing. In 1838 the place was incorporated as a town and in 1853 a city charter was granted. Population, 1920, U. S. census, 324,410.

Kansas-Nebraska Bill, a bill passed by Congress in May, 1854, for the organization of the territories of Nebraska and Kansas. The bill was proposed by Senator Stephen A. Douglas, chairman of the committee on territories. The most important feature of the bill was the "popular sovereignty" clause, which gave to the people of the territories to be formed the right to decide for themselves whether or not slavery should exist within the boundaries of the territories. After a long and bitter debate the bill became a law, May 30. The controversy over the slavery question, somewhat allayed by the Compromise of 1850, was renewed and the crisis brought much nearer. See Kansas, subhead *History;* Nebraska, subhead *History;* Compromise of 1850; Missouri Compromise.

Kansas, University of, at Lawrence (1864). This institution, which has a fine site of 160 acres and excellent buildings, opened in 1866. It includes schools of medicine, education, engineering, law and pharmacy, a college of liberal arts and sciences, as well as a graduate school. Its teaching staff numbers about 220 of both sexes. The enrollment is over 3928.

The library contains about 126,000 volumes and there is a natural history collection valued at $300,000.

Kant, *Kahnt,* **Immanuel** (1724-1804), a famous German philosopher, born at Königsberg, Prussia, the son of a saddler said to be of Scottish descent. In the year 1740 he entered the university of his native town as a student of theology, but devoted most of his time to philosophy, mathematics and physics. After completing his studies, he was a tutor in private families for nine years, becoming privat-docent at the university in 1755. This position he held for 15 years, lecturing on logic, metaphysics, physics, mathematics and, during the latter part of the time, on ethics, anthropology and physical geography. In 1762 he declined the chair of poetry, in 1770 was appointed professor of logic and metaphysics, and continued in his position at Königsberg until 1797, when he retired because of the infirmities of old ago.

As he became known, keen-minded students flocked to his lecture room from all parts of Germany. He never left his native province, his longest journeys being to visit county seats in the neighborhood of Königsberg. Nevertheless, by extensive reading he gained an accurate knowledge of the earth. He lived a simple life in a little house in a quiet quarter of the city; but he enjoyed good living and friends. He was small in stature, well proportioned, sound in health, a modest, honest, earnest lover of truth.

Kant says that David Hume aroused him from his "dogmatic slumber," and he set about developing a system that would save philosophy from skeptical suicide. The dualism in philosophy which began with Descartes had led to two opposite results: realism, as represented by Hume, had made matter absolute, practically denying mind; and idealism, as represented by Berkeley, in an equally one-sided way had emphasized mind to the exclusion of matter. Kant brought the two streams into one channel again and reckoned with both. All knowledge, he said, was the product of two factors, the external world and the knowing subject. The former furnishes the material of knowledge; the latter, through the conceptions or "categories" of the understanding, provides the form which makes this material intelligible. We do not know the world of "things in themselves," which supplies the data of knowledge, but only phenomena as they are interpreted by the mind, that is, the world of experience. This negative and critical part of Kant's philosophy is contained in his great book *Critique of Pure Reason,* published in his 57th year (1781).

The philosophy of Kant introduced a new epoch in the history of thought and has influenced all subsequent philosophy. He was thoroughly conscious of the significance of what he was doing, and compared it to the revolution wrought by Copernicus in astronomy. Other works are *Critique of Practical Reason* and *Critique of Judgment.*

Ka' olin, a pure white clay which takes its name from the Chinese *Kaoling,* a hill in China where the clay is found. It occurs in large deposits in Cornwall, England, and in the United States in Connecticut, Vermont, Pennsylvania, Delaware, Georgia and North Carolina. The crude material is extracted by open cutting, and prepared for the market by the use of settling tanks, which separate it from the accompanying quartz and other impurities. The pure kaolin thus separated is soft and friable, burns to pure white and is an excellent material for the manufacture of porcelain. It is also used to some extent in the manufacture of paper and for giving body to porous cloth. See POTTERY.

Karakorum, *Kah" rah ko' rum,* **Mountains,** a continuation of the Hindu Kush Mountains of central Asia, traversing a portion of Tibet and separating Kashmir from Eastern Turkestan. The peaks are among the highest of the world, Godwin-Austen (28,278 ft.) being next to Mt. Everest in height. Several passes cross this range almost at the line of perpetual snow (18,600 ft.),

and great glaciers lie upon its western slopes. These mountains form the watershed dividing the tributaries of the Indus from the northern rivers.

Karlsbad, *Karlz' baht,* or **Carlsbad,** a town in Bohemia, one of the famous watering places of Europe. It is situated on both banks of the Tepl, 116 m. by rail n.w. of Prague. There are 19 mineral springs, and of these the most famous is the Sprudel, whose waters have a temperature of 165°. Over 35,000 people visit the resort annually, and its waters are extensively shipped and used for curative purposes. Charles IV first made the place distinguished by establishing a hunting seat here in 1347. In 1707 the town was made a free royal city. Population, about 15,000.

Karlsruhe, *Karls' roo" e,* or **Carlsruhe,** the capital of the Grand Duchy of Baden, Germany. It is situated a little east of the Rhine, 30 m. n.w. of Stuttgart. The city is laid out in the shape of an open fan, and well-paved streets radiate from the palace as a center. The buildings include the grand-ducal palace, the Evangelical Church, the Roman Catholic Church, the new palace of the Crown Prince, the Court Theater, the School of Art and numerous other educational institutions of prominence. The School of Forestry is the oldest of its kind in Germany. Various artistic, scientific and industrial organizations and charitable institutions are located here. The Margrave Karl Wilhelm established a hunting palace here in 1715. Population, over 111,000.

Kar'nak, The Temple of, a celebrated group of shrines situated near the village of Karnak in Upper Egypt and upon the right bank of the Nile. This is the site of the old city of Thebes, and the principal temple is that of Ammon of Thebes, later the chief deity of Egypt. The temple was one of the most magnificent of the country and was adorned with immense columns, carvings, sculptures and paintings. The entrance to the inclosure lay upon the river bank, and from this an avenue of sphinxes led to a massive gateway opening into an inner court. Six of the 12 great columns of this court still stand, and about them were ranged the temples built by various Egyptian kings, Rameses I and III and Seti II. All of the buildings are richly decorated and their inscriptions and carvings form a key to much early Egyptian history and art. The whole is surrounded by a wall that encloses the temples, courts and a sacred lake.

Kashmir, *Kash meer',* or **Cashmere.** See INDIA.

KATYDID

Ka' tydid", a grasshopper of the Locustid Family. The katydids live upon trees and shrubs and are apt to do serious injury to the foliage, although they will eat any animal food which may be obtained without great exertion. The chirp of the katydid is heard only at night, but is then almost continuous. It is made by bringing together the ends of the wing covers, which have upon their inner surfaces two roughened patches known as the stridulating organs.

Katydids are commonly green in color

and thus not easily distinguished from the foliage upon which they rest. Their antennæ are long and slender, their hind legs fleshy and strong and of such length that the knee joint is above the back. They lay their eggs in rows along the under margins of leaves and up the stems of twigs in such a manner that each egg slightly overlaps its predecessor. Sometimes a single row completely outlines the leaf.

The species of katydids are distinguished by the differences of structure indicated in their names; for example, the forked-tail, narrow-winged, broad-winged, angular-winged, round-winged and oblong leaf-winged katydids. Some varieties of these are occasionally found that are gray or even pink in color, though such are very rare. See GRASSHOPPER.

Kauff'mann, Angelica (1741-1807), a German portrait painter, born in Switzerland, the daughter of an artist of note. She studied in Italy, where she painted many portraits and assisted her father in the decoration of churches. Later she visited England, where her talents for music, painting, engraving and etching were admired, as she herself was loved for her social graces. After her marriage with Antonio Zucchi, also an artist, she resided in Rome until her death. Her portraits were her best work, those of women being particularly pleasing; her historical paintings, though charming, lack the strength of her other work. Her portraits may be found in the Berlin Museum, the National Gallery of London and Munich and Uffizi galleries.

Kaulbach, *Koul' bahk,* **Wilhelm von** (1805-1874), a German historical painter. A number of public buildings were decorated by him, and he has rank among the leading historical painters of Germany. His most noteworthy paintings include *Destruction of Jerusalem by Titus, The Fall of Babel* and *The Battle of Salamis.*

Kean, *Keen,* **Edmund** (1787-1833), an English actor, born in London. He was acting in tragic Shakespearean rôles when he was 14. In 1814 his appearance as Shylock at Drury Lane met with the enthusiastic reception he so much desired, and by the most prominent men of letters and of the stage in London he was declared a master-tragedian. He played in the United States in 1820, again in 1825, and in Quebec he was made chief of the tribe of Huron Indians, because of the pleasure his acting afforded them. His small stature was practically his only disadvantage, for in facial expression and with his voice of resistless power his presence became very effective. He was versatile, excelling in many rôles, but primarily in the characters of Shakespeare that demanded great tragic impersonation.

Keane, John Joseph (1839-), an American educator and archbishop of the Roman Catholic Church, born in Ireland but educated in St. Charles' College and St. Mary's Seminary, Baltimore. He became assistant pastor of St. Patrick's in Washington, where he was active in work among young men. Later he became Bishop of Richmond (Va.), where he labored incessantly for the advance of the negro. Bishop Keane was chosen to aid in planning the Catholic University, and when it was opened in 1888, became its first rector. His zeal, his oratorical ability and his undoubted fitness for his work have won him many honors. In 1901 he became Archbishop of Dubuque, in which position he has continued to maintain great interest in Catholic education.

Kearny, *Kar' ny,* **N. J.,** a city of Hudson Co., opposite Newark, about 9 m. w. of New York City, on Newark Bay, between the Passaic and Hackensack rivers, and on the Pennsylvania, the Lehigh Valley, the Erie, and the Delaware, Lackawanna & Western railroads. The town was settled in 1765 and called New Barbadoes. In 1871 it was incorporated and named in honor of Gen. Philip Kearny. The city has several large manufactories of linoleum, celluloid and thread. Other manufactures are metal bedsteads, golf balls, brass novelties and roofing material. The New Jersey State

Soldiers' Home and the Sacred Heart Industrial School for Boys are located here. Arlington is a fine residential part of the city. Population in 1920, 26,724.

Kearny, Philip (1815-1862), an American soldier, born in New York City and educated at Columbia College. He entered the army when 22 as lieutenant of dragoons, in 1839 was sent to observe French cavalry tactics, and served in the Algerian War. In 1840 he was aide to General Macomb and from 1841 to 1845 was on General Scott's staff. Having served in an Indian campaign, he entered the French army and distinguished himself in the Italian war of 1859. Returning to America two years later, he joined the Union troops, and was killed in 1862.

Kearsarge, *Keer' sarj,* The. See ALABAMA CLAIMS.

Keats, *Keets,* John (1795-1821), an English poet, born in London and educated at Enfield. In 1810 he was apprenticed to learn surgery, but, being too imaginative for work of this nature, soon gave it up. Shortly after this he formed the acquaintance of Leigh Hunt, who introduced him to Shelley and encouraged him to write. In 1817 Keats published his first volume of poems, most of them crude and immature, but in places showing the promise of better work to come. He was now mingling with a group of writers and artists, counting among his friends, Coleridge, Wordsworth, Lamb and Hazlitt, and in 1818 issued his first long narrative poem, *Endymion.* This was received by the reviewers with overwhelming censure; it is an interesting tradition, quite unfounded, that the early death of Keats was due to the savage criticism his poem received, and Shelley's great elegy *Adonais* is based on this idea. *Endymion,* though it contains many fine lines, is on the whole chaotic and overadorned. About this time the poet's health began to fail and early in 1820 he showed unmistakable symptoms of consumption. Shortly after the publication of his third and last volume of poems (July, 1820), he went to Italy, dying in Rome.

Keats developed wonderfully after the publication of *Endymion,* and his last volume, entitled *Lamia, Isabella, The Eve of Saint Agnes and Other Poems,* which contains besides the poems named several great odes and the fragment *Hyperion,* reveals all the beauty of his earlier work, but more strength and artistic calmness. His essential quality as a poet, sensitiveness to beauty, concretely expressed in his famous line, "A thing of beauty is a joy forever," is an overmastering feeling. He worships beauty for its own sake, with no thought of its ethical value. His best poems are marvels of music and color and show his remarkable grasp of form. Dying before he was 26, he left behind a body of verse that deeply affected that of his successors, and he greatly enriched the diction and melody of English poetry by bringing into it new elements from the poetry of the Renaissance.

Ke'ble, John (1792-1866), an English divine and poet, born at Fairford, in Gloucestershire. He graduated from Oxford with high honors, and in 1815 was ordained deacon, becoming a priest the following year. In 1836 he became vicar of Hursley, near Winchester. He was quiet and retiring, and yet by his sermon on "National Apostasy," preached at Oxford in 1833, he practically was the real author of the Oxford Movement. From 1831 to 1841 he was professor of poetry at Oxford. His religious verse, published under the title of *The Christian Year,* was widely influential and met with remarkable success. To the literature connected with the Oxford Movement he contributed seven of the *Tracts for the Times* and also shared in translating the *Library of the Fathers.*

Keeley, Leslie (1836-1900), an American physician, born in St. Lawrence County, N. Y. He was educated at Rush Medical College, Chicago. After having served as an army surgeon during the Civil War, he began to practice at Dwight, Ill., where in 1880 he opened a sanitarium for the cure of inebriates, with a preparation which he himself had

discovered. Subsequently similar establishments were opened throughout the country. His treatment was known as the "Keeley Cure."

Keene, *Keen,* **N. H.,** county seat of Cheshire Co., 50 m. s.w. of Concord and 43 m. w. of Manchester, on the Ashuelot River and on two lines of the Boston & Maine Railroad. It has broad and shaded streets and fine public buildings. Keene is noted for its manufactories of woodenware, and there are factories for making furniture, tubs, chairs and pails; potteries, woolen mills, glue works, toy factories, sash, blind, door and match works and boot, shoe and leather factories. Repair shops of the Boston & Maine Railroad are located here. The town was settled under the Massachusetts authority in 1734, and was known as Upper Ashuelot until it was incorporated in 1753 by New Hampshire under its present name. It received a city charter in 1874. Population in 1920, 11,210.

Kel'ler, Helen Adams (1880-), an American writer, born in Tuscumbia, Ala. She became deaf and blind when 19 months old, as the result of illness. When seven years old, Miss Anne Mansfield Sullivan became her teacher, and she soon learned to read, write, talk with her fingers and finally to speak. She entered Radcliffe College in 1900 and graduated there four years later. Besides contributing occasional papers to leading magazines, Miss Keller has written *The Story of My Life, Optimism, The World I Live In* and *The Song of the Stone Wall.*

Kelp, the ashes of a seaweed growing upon the Pacific coast of North and South America and along the shores of the British Isles. The name is also occasionally applied to the seaweed itself, which is a plant remarkable for its great size. It grows from rootlike appendages which hold it fast to the bottom, and it spreads in flattened, leaflike branches to an extent of nearly 1000 ft. By accident it was discovered that the ashes of the plant contain a great amount of soda, and they were once used in the production of glass and soap. Now they are employed chiefly as a source of iodine. See IODINE.

Kel'vin, Lord. See THOMSON, SIR WILLIAM.

Ken'esaw Mountain, Battle of, an engagement of the Civil War, fought near Marietta, Ga., June 27, 1864. General Sherman, with 98,000 Federals, was marching from Chattanooga to Atlanta, and 60,000 Confederates, under General Johnston, were making a masterly retreat before him. The latter finally intrenched themselves on Kenesaw Mountain, where they were attacked under the lead of Logan and McCook. Shortly after the battle, Sherman turned Johnston's left wing, and on July 17 crossed the Chattahoochee River near Atlanta.

Ken'nan, George (1845-), an American traveler and writer, born at Norwalk, Ohio. Mr. Kennan was educated in the common schools of Ohio, and afterwards studied telegraphy, becoming, in 1864, an operator of the Russo-American Telegraph Company. His duties in connection with this company took him to Kamchatka and from there on a tour through Siberia. In 1870-1 he explored the eastern Caucasus and the lower course of the Volga River, and in 1885-6 he made a special study of the convict and exile systems of Siberia. Because of certain articles which were written by him, unfavorable to the Russian Government, he was later expelled from the empire. He was a special war correspondent for the New York papers during the Spanish-American War and the Russo-Japanese War, and since 1909 he has been on the staff of *The Outlook.* His works include *Siberia and the Exile System, Folk Tales of Napoleon* and *The Tragedy of Pelée.*

Kennebec, *Ken' e bek,* **River,** a river of Maine, rising in Moosehead Lake in the western part of Piscataquis County. It flows south, entering the Atlantic Ocean 14 m. below Bath. It is 175 m. long and is navigable for large boats to Bath and for smaller ones to Hallowell, except during four months of the year

when navigation is closed by ice. Augusta, Waterville and Gardiner lie upon its banks.

Keno'ra, a town in Ontario, Canada, situated at the outlet of the Lake of the Woods and on the Canadian Pacific Railway, 133 m. by rail e. of Winnipeg. It is a favorite summer resort and is the distributing point for the surrounding gold-mining district. One of the largest flour mills in Canada is located here. Other industries are represented by sawmills, reduction works and factories for the manufacture of boats. There is also extensive sturgeon fishing. Population in 1911, 6158.

Keno'sha, Wis., a city and the county seat of Kenosha Co., 34 m. s. of Milwaukee and 50 m. n. of Chicago, on Lake Michigan and on the Chicago & North Western and other railroads. Freight and passenger steamboats ply between Kenosha and other lake ports, and interurban electric lines connect it with Chicago, Milwaukee and other cities in the vicinity. The town is a trade center for a large district and its manufacturing interests are extensive. Chief among its factory products are brass and iron bedsteads, mattresses, wagons, carriages, brass goods, furniture, plumbers' supplies, machine-shop products, typewriters and knit goods. One of the largest automobile factories in the country is located here, and there is also a large sole-leather tannery. Kenosha is beautifully situated on high bluffs above the lake and is remarkable for its salubrious climate. The Simmons Library is a distinctive feature of the town. The place was settled in 1832 and named Southport; it was incorporated in 1842. In 1850 it received its city charter and its present name. Population in 1920, 40,472.

Kent, James (1763-1847), an American jurist, born at Fredericksburgh, N. Y. He studied at Yale College and began the practice of law in 1785. Kent served two terms in the Legislature of his state, and then accepted the chair of law in Columbia University, occupying that position from 1794 to 1798, when he was made a justice of the Supreme Court of New York State. He became chief justice in 1804, and was chancellor from 1814 to 1823. After this he retired to his private law practice. He wrote *Commentaries Upon American Law,* a work of great influence.

Kentuck'y, THE BLUE GRASS STATE, one of the East South Central States, is bounded on the n. by Ohio, Indiana and Illinois, on the e. by West Virginia and Virginia, on the s. by Tennessee and on the w. by Missouri. The northern boundary is formed by the Ohio River, one-half of the eastern by the Big Sandy and the western by the Mississippi.

SIZE. The extreme length from east to west is 458 m. The breadth varies from 171 m. at the widest point to 40 m. on the western boundary. The area is 40,598 sq. m. Kentucky is a little smaller than Ohio or Tennessee, about eight-ninths the size of Pennsylvania, or about the size of Indiana and Connecticut combined, and the 36th state in area.

POPULATION. In 1920 the population was 2,416,630. From 1910 to 1920 there was a gain in population of 126,725, or 5.5 per cent. There are 60.1 inhabitants to the square mile and the state's rank in population is 15.

SURFACE. The southern half of the eastern boundary is formed by the Cumberland Mountains, and the Cumberland Plateau extends from the Valley of the Big Sandy southward into Tennessee and westward for about 70 m. West of the Cumberland Mountains and parallel with them is Pine Mountain. Between these ranges is the Cumberland Valley, whose altitude is from 1000 to 1500 ft. above the sea. The valley is from 10 to 15 m. wide and 75 m. long, and is occupied by the Cumberland River. The peaks in these mountains range from 2000 to 4000 ft. in altitude. From the Cumberland Plateau the surface slopes gradually to the northwest to meet the Ohio. To the west of this plateau is the great north and central Blue Grass Region, having an area of over 10,000 sq. m. Along the southern and eastern

borders of this region is a range of sand hills extending from Portsmouth, Ohio, to the mouth of the Salt River below Louisville. Some of these hills have elevations of 1000 to 2000 ft. and the most prominent have local names, as King's Mountain, Big Hill and Muldrow's Hill. West of the Blue Grass Region is a limestone region, characterized by depressions called sink holes and having underground streams and caverns. That part of the state between the Tennessee and Mississippi consists mainly of bottom lands.

Rivers. The Ohio, flowing along the northern boundary, receives all the important rivers of the state. Proceeding from the east westward, these are the Licking, draining the eastern part; the Kentucky, in the east-central part; the Salt, in the north-central part; and the Green, in the west-central. The Cumberland and the Tennessee cross the state a few miles from its western boundary. The Cumberland rises in the Cumberland Valley, flows southward, then westward and crosses the boundary into Tennessee; then it enters the state again and flows parallel to the Tennessee, entering the Ohio at Smithville. The Tennessee crosses the western part of the state.

Scenery. In the extreme southeast is the famous Cumberland Gap, noted both for its scenery and its historic associations. This important pass was constantly contended for by both Confederate and Federal armies during the Civil War. The Cumberland Valley, buttressed on each side by mountain peaks, is one of the most beautiful slopes in the Appalachian region. Some of the rivers have worn deep canyons in the rock, which are of interest. That of the Kentucky River is a canyonlike gorge more than 400 ft. in length. In the limestone region are Mammoth Cave, the largest in the world, and other caverns (See Mammoth Cave). In this region also are localities where the rocks have been worn into unique and fantastic forms. The Blue Grass Region is noted far and wide for its beautiful landscapes.

Climate. Kentucky has a mild temperate, equable and healthful climate. In the mountainous sections the summers are remarkably pleasant and throughout the state the heat is less than in the states north of the Ohio. The winters are mild and short. The mean annual temperature is about 55°, with an average for July of 75° and of 35° for the winter. The annual rainfall is 40 inches. The snowfall is very light.

Minerals and Mining. There are two important bituminous coal fields within the state, whose combined area is about 20,000 sq. m. The larger of these is in the eastern part of the state. Coal mining is the most important mineral industry, the output being about 23,000,000 tons. There are also deposits of cannel coal, in the production of which Kentucky is the leading state. Petroleum is found in the southern part of the state from Wayne to Allen counties, and in Knox, Floyd and other counties. Also to the northeast of this field is another in Bath and Rowan counties, on the Licking River. Natural gas occurs in Menifee, Wolfe, Martin and Breckinridge counties, and is piped long distances for commercial use. Fluor spar is mined on a large scale in Crittenden and Livingstone counties. Limestone valuable for building purposes and another variety valuable for cement occur in several counties, the most prominent outcroppings being in Jefferson, Jessamine, Warren, Grayson and Caldwell counties. The finest variety of this building stone is known as Bowling Green marble, occurring in Warren County. Clay suitable for the manufacture of brick and pottery is widely distributed throughout the state.

Forests and Lumber. The swamps and many of the bottom lands are heavily timbered, and in the mountain lands in the east there are valuable forests of hard wood, including many varieties of oak, chestnut, blackjack, sweet-gum, box elder, wild cherry, black walnut, ash, poplar, maple and beech. Cypress and pine also occur. Lumbering is an important industry along the headwaters

of the Cumberland, Licking and Kentucky rivers.

AGRICULTURE. Kentucky has a favorable climate, fertile soil and abundant rainfall for agriculture. Her geographical position is also such as to bring her within easy reach of excellent markets. These conditions have been important factors in making Kentucky one of the leading agricultural states. The average size of the farms is less than 100 acres and intensive farming is practiced in many localities.

Soil. The soil of the bottom lands is rich alluvium. That of the Blue Grass Region is one of the finest soils in the world, being self-fertilizing from the decomposition of underlying limestone and phosphate rock. In this region farms a century old are almost as productive as when first opened to tillage.

Products. Tobacco is the chief money crop and in its production Kentucky leads the Union, producing almost twice as much as any other state. The western tobacco fields are grouped about Christian and Daviess counties, while the center of the eastern fields is in Fayette County. Kentucky also raises more hemp than any other state, though this crop is not relatively so important as formerly. Corn is the most valuable cereal crop, and other important crops are hay, wheat and potatoes. The farms along the Ohio are quite generally given to raising garden vegetables for the markets in Cincinnati, Covington, Newport and Louisville. Orchard fruits are a valuable source of income in the uplands, as are strawberries in Warren and Christian County.

Raising live stock is one of the most important agricultural industries of the state. For many years Kentucky has been famous for its blooded stock, and in the Blue Grass Region are raised the finest driving and saddle horses in America. This is due not only to the adaptability of the region to stock growing, but also to the intelligent care of the breeders.

MANUFACTURES. The leading manufacturing industries are connected with tobacco and tobacco products, consisting of smoking and chewing tobacco, cigars and snuff. The chief centers of these industries are Louisville, Henderson and Owensboro. For many years Louisville has been the leading tobacco market of the world. The manufacture of flour and gristmill products is next in importance. Then follow the production of iron and steel, pork packing, lumbering and the tanning and curing of leather. Louisville is an important center for the manufacture of men's clothing. It is also the chief manufacturing city of the state.

TRANSPORTATION AND COMMERCE. The river boundaries give the state over 800 m. of navigable water. The Tennessee and Cumberland are navigable for their entire length within the state. The Licking, Kentucky, Salt and Green are also navigable in their lower courses. There is a canal around the falls of the Ohio at Louisville which greatly increases the usefulness of this stream. The leading railway systems are the Illinois Central, the Louisville & Nashville, the Queen & Crescent and the Chesapeake & Ohio. There are over 4000 m. of railway within the state. The central and western parts have fair transportation facilities, but there is a large region in the eastern part among the mountains which has not yet been opened to railway construction.

The commerce consists in exporting tobacco and tobacco products, fruits and vegetables, live stock, coal and distilled liquors, and in importing such manufactured goods and foodstuffs as cannot be produced with profit. Louisville is the chief commercial center.

GOVERNMENT. The present constitution was adopted in 1891. The executive department consists of a governor, lieutenant-governor, treasurer, auditor, secretary of state, commissioner of agriculture, labor and statistics, attorney-general and superintendent of public instruction. These officers are elected for four years and are not eligible for re-election a succeeding term. The Legislature consists of a Senate of 38 mem-

bers and a House of Representatives of 100 members. Senators are elected for four years and representatives for two. Regular sessions are biennial and limited to 60 legislative days. The Legislature meets in January of even years.

The judicial department consists of a Court of Appeals composed of seven judges elected by districts for eight years, and Circuit Courts in each judicial district into which the state is divided. The judges of the Circuit Courts are elected by districts for six years. The county is the unit for local administration.

Education. The educational system is under the direction of a state superintendent of public instruction, and the schools of each county are under the supervision of a county superintendent. Separate schools are maintained for white and colored children and the latter are taught by colored teachers. The cities and larger towns maintain graded schools with high schools. There are also county high schools in a number of counties. State normal schools for training white teachers are maintained at Richmond and Bowling Green. There is a normal and industrial school for training colored teachers at Frankfort. The University of Kentucky, which includes the agricultural and mechanical college, is at Lexington. The leading educational institutions not under control of the state are Berea College at Berea; Central University at Danville; Georgetown College at Georgetown; and the Kentucky Wesleyan at Winchester.

State Institutions. The hospitals for the insane are at Lexington, Hopkinsville and Lakeland. The state school for the blind is at Louisville, the school for the deaf is at Danville and the institution for feeble-minded children is at Frankfort. The penitentiaries are at Frankfort and Eddyville and the reformatory at Greendale.

Cities. The chief cities are Frankfort, the capital; Louisville, Covington, Newport, Lexington, Paducah, Owensboro, Henderson and Bowling Green.

History. Kentucky, from the Iroquois word "meadowland," was first visited in 1750 by Dr. Thomas Walker, though not settled till James Harrod established a colony at Harrodsburg, in 1774. Daniel Boone founded the Fort of Boonesborough in 1775. When Virginia, which claimed Kentucky as a royal grant, passed an act allowing separation, Kentucky accepted. Two years later, June 1, 1792, it was admitted to the Union.

Henry Clay was prominent in the War of 1812, for which Kentucky furnished many soldiers. Nearly 14,000 of her sons fought in the Mexican War. Though a slave state, Kentucky strove for armed neutrality during the Civil War; but Union forces soon possessed it, and the battles of Mill Spring, Richmond and Perryville occurred within the state. Forty thousand Kentuckians fought for the Confederacy, 92,000, for the Union. In recent years the state has grown in wealth and prosperity. Railways have been built, mines developed and cities beautified. Consult N. S. Shaler's *Kentucky* in the American Commonwealths Series.

Governors. Isaac Shelby, 1792-1796; James Garrard, 1796-1804; Christopher Greenup, 1804-1808; Charles Scott, 1808-1812; Isaac Shelby, 1812-1816; George Madison, 1816; Gabriel Slaughter, 1816-1820; John Adair, 1820-1824; Joseph Desha, 1824-1828; Thomas Metcalfe, 1828-1832; John Breathitt, 1832-1834; James T. Morehead, 1834-1836; James Clark, 1836; Charles A. Wickliffe, 1836-1840; Robert P. Letcher, 1840-1844; William Owsley, 1844-1848; John J. Crittenden, 1848-1850; John L. Helm, 1850-1851; Lazarus W. Powell, 1851-1855; Charles S. Morehead, 1855-1859; Beriah Magoffin, 1859-1862; James F. Robinson, 1862-1863; Thomas E. Bramlette, 1863-1867; John L. Helm, 1867; John W. Stevenson, 1867-1871; Preston H. Leslie, 1871-1875; James B. McCreary, 1875-1879; Luke P. Blackburn, 1879-1883; J. Proctor Knott, 1883-1887; Simon B. Buckner, 1887-1891; John Y. Brown, 1891-1895; William O. Bradley, 1895-1899; William S. Taylor, 1899-

1900, William Goebel, 1900; J. C. W. Beckham, 1900-1907; Augustus E. Willson, 1907-1911; James B. McCreary, 1911-1915; Augustus Owsley Stanley, 1915-1919; E. P. Morrow, 1919—.

Kentucky and Virginia Resolutions, two series of resolutions adopted by the Legislatures of Kentucky and Virginia, directed against the Alien and Sedition Laws, with a protest and warning against the assumption of the Federal Government of powers belonging to the state. The Kentucky Resolutions, nine in number, were drafted by Thomas Jefferson and were adopted by the Kentucky Legislature in November, 1798. These resolutions were the first definite and official expression of views known and advocated years later as states' rights. The Virginia Resolutions, eight in number, were adopted in December, 1798. They were drafted by Madison and were much milder in tone. The resolutions of the two states were sent to the executives of the other states to be laid before their legislative bodies. Seven states responded, but none gave any encouragement to the sentiments of the resolutions. See ALIEN AND SEDITION LAWS; NULLIFICATION.

Kentucky, University of, at Lexington (1865). Up to 1908 this institution bore the name of the Agricultural and Mechanical College. For some years it was a part of Kentucky University, now Transylvania College, at Lexington. In 1908, the name was changed to State University of Kentucky, and in 1916 to University of Kentucky. It has a campus of 72 acres and a farm of 254 acres in connection with its experiment station. It has a staff of 300 persons, and offers courses in agriculture, arts and science, engineering, and law, and maintains a department of education. It offers courses in University extension, maintaining a department for that work. Its library contains 40,000 volumes. The enrollment is about 1,400. The president is Frank L. McVey, Ph.D., LL.D.

Ke'okuk, Iowa, a city and one of the county seats of Lee Co., 166 m. s.e. of Des Moines and about 200 m. above St. Louis, on the Mississippi River, at the mouth of the Des Moines, and on the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Wabash, the Toledo, Peoria & Western and other railways. A railway bridge 2200 ft. long spans the Mississippi at this point; another crosses the Des Moines. Keokuk is built for the most part upon bluffs along the Mississippi, and is at the foot of the Des Moines Rapids of that river, around which the Federal Government has constructed a ship canal (opened in 1877) at a cost of nearly $8,000,000. A dam across the Mississippi is one of the most noted pieces of engineering work in the country, providing power exceeding 100,000-horsepower, which is largely utilized for manufacturing purposes. With its transportation and manufacturing facilities, Keokuk has become an important wholesale and shipping point and a trade center of the surrounding agricultural region. The principal industrial establishments are lumber mills, boot and shoe factories, flour mills, a poultry-packing plant, canning factories, cold-storage plants, gunpowder works and manufactories of stoves, tin cans, pickles, cereals, starch and ready-made clothing.

Keokuk is the seat of the Keokuk Medical College, and has a dental college, a school of pharmacy and two hospitals. Other important features are a public library, the Union Railroad Station, a Home for the Friendless, a Y. M. C. A. Building, an opera house, St. Vincent's Academy, a government building and Rand Park. A National cemetery is located here. Settled in 1836, Keokuk was incorporated in 1848, receiving its charter in the same year. Since 1907 it has been one of the five cities of the state which are governed by a special charter. Population in 1920, 14,423.

Kep'ler, Johann (1571-1630), a German astronomer and mathematician. He was a close friend and a pupil of Tycho Brahe, to whose teaching he was largely indebted for much of his later success. It was in response to Brahe's invitation that Kepler became his assistant in the

observatory near Prague. After the death of Brahe, Emperor Rudolph II appointed Kepler to succeed him as imperial mathematician. In 1612 he became mathematician to the states of Upper Austria, and in 1628 he entered the service of Wallenstein, with whom he continued until his death.

Kepler was one of the leading mathematicians of his age. He early arrived at the conclusion that there must be some reason for the movements of the bodies in the solar system, and upon the three laws that he discovered and stated in the solution of this problem his fame as an astronomer chiefly rests. These laws are as follows: (1) The orbit of each planet around the sun is an ellipse having the sun at one focus. (2) The area swept over per hour by the line joining the sun and a planet is the same for all parts of the planet's orbit. (3) The squares of the periodic times of revolution of the planets around the sun are proportional to the cubes of their mean distances from the sun. The first two laws were stated in 1609, the third in 1619.

From a careful study of these laws in the light of the principles of mechanics, Sir Isaac Newton was enabled to show that each planet is held in its orbit around the sun by a force which is inversely proportional to the square of its distance from the sun. This result led him to formulate the far more general law; namely, the law of universal gravitation. See GRAVITATION; MOTION, LAWS OF; PLANET; SOLAR SYSTEM.

Ker'osene", a liquid obtained from crude petroleum and used extensively for illuminating purposes. The kerosene obtained from the first distillation contains a number of volatile and highly inflammable substances, which have to be separated by further distillation before it is ready for use. Kerosene has a light yellowish tint and a strong, disagreeable odor. To be safe it should not yield inflammable vapors below 110° or 120° F. See PETROLEUM.

Ker'shaw, Joseph Brevard (1822-1894), an American soldier, born at Camden, S. C. In 1843 he began practicing law, and was at one time a member of the Senate of South Carolina. He joined the Confederate army at the outbreak of the war, and commanded a regiment of volunteers in the first Battle of Bull Run. Later, he was made brigadier-general and was engaged at Gettysburg, Fredericksburg and Chickamauga. In 1864 he was made major-general and given the command of a division. After the war he returned to his practice in South Carolina, entered the Senate, and became judge of the Circuit Court, holding that position until 1893.

Kettledrum, a musical instrument hemispherical in shape, its flat surface consisting of a piece of parchment tightly stretched, the tension being regulated by a series of screws placed in the circular rim. The drum rests upon a tripod and is played upon with rubber- or sponge-tipped sticks.

Kewanee, *Ke wah' nee,* **Ill.,** a city of Henry Co., 56 n.w. of Peoria, about 100 m. n.w. of Springfield and 132 m. s.w. of Chicago, on the Chicago, Burlington & Quincy and other railroads. The city is engaged in farming, in the manufacture of agricultural implements and in mining. Other articles manufactured are gloves and mittens, pumps, boilers, steam-heating machinery, carriages and wagons. The city has a public library. Kewanee was chartered in 1897. Population in 1920, 16,026.

Key, Francis Scott (1780-1843), author of *The Star Spangled Banner,* born in Frederick County, Md. He graduated at St. John's College, Annapolis, entered the law profession and later become district attorney for the District of Columbia. During the War of 1812, while the British were attacking Baltimore (1814), he had occasion to go aboard the British fleet under a flag of truce, being detained while the bombardment of Ft. McHenry was taking place. During the night he watched the progress of the fight from a British ship, anxiously waiting for the morrow, and, when in the morning he saw the Stars and Stripes still waving,

composed the poem that is today a favorite among American national songs.

Key West, Fla., a city, port of entry and the county seat of Monroe Co., on a small coral island of the same name, about 60 m. s. of the mainland and 90 m. n.e. of Havana, Cuba, being the most southerly point of the United States. The city has steamboat connection with Miami and Port Tampa, Fla., with Mobile, Ala., with Galveston, Texas, with ports on the Atlantic seaboard and with the West Indies, and schooner service to the Bahamas, British Honduras and New York City; and there is an extension of the Florida East Coast Railway to the city from Miami. There is a fine harbor provided with two lighthouses and defended by Ft. Taylor, which occupies an artificial island near the main entrance. Key West is remarkable for its climate (the mean annual temperature is 76° F.) and for its tropical vegetation. Many species of plants are found here which are found nowhere else in North America; and the banana, almond, coconut, palm, cork, oleander and jasmine are common. Chief among the industries of the city are cigar manufacturing and sponge fishing; and there is a considerable trade in cigars, sponges, fruit, vegetables, fish, turtles and salt.

Key West is a beautiful city, with broad streets and luxuriant gardens, and it is a delightful winter resort. Interesting features of the city are the United States Custom-House and Post Office, the county courthouse, city hall, the Methodist Seminary, a convent and a public library. An important United States naval station is located here, with marine hospital, docks, barracks and marine railway and machine shops. Key West was settled in 1822 and ten years later was chartered as a city. It figured conspicuously in the Civil War and also in the war with Spain in 1898. Population in 1920, 19,039.

Khamsin, *Kam' sin,* a warm wind blowing over northern Africa through seven weeks of the spring. Its name, meaning fifty, refers to the number of days' duration of the wind at a high velocity.

Khartum, *Kahr" toom',* the capital of the Anglo-Egyptian Sudan, situated on the banks of the Blue Nile above its junction with the White Nile, and on the Cape-to-Cairo Railway, 1345 m. by rail s. of Cairo. Features of interest are the governor-general's palace, the Anglican Church, the Coptic Church, the Gordon Memorial College, a bronze statue of General Gordon, several missions, the zoological gardens, the museums, the great mosque with its two minarets, and the line of fortifications on the south extending from the Blue to the White Nile. The Mahdists captured the city in 1885, and killed General Gordon. Lord Kitchener in turn overthrew the Mahdists and captured the city in 1898. Population in 1907, with suburbs, excluding Omdurman, 69,349.

Khingan, *King" gahn',* **Mountains,** a long system of mountain chains separating Mongolia from Manchuria. The principal range is known as the Great Khingan and is one of the boundaries of the Gobi Desert. The entire system extends from the Great Wall near Peking to the basin of the Amur between Siberia and Manchuria. The mountains are about 7000 ft. in altitude.

Khyber, or **Khaibar,** *Ki' bar,* **Pass,** an important pass from India into Afghanistan. It extends from 10 m. west of Peshawar to the plain of Jelalabad, a distance of about 30 m. At places the pass is but 20 ft. wide and is hemmed in by lofty vertical cliffs.

Kiauchau, *Kyah' o chou',* a city on the southern coast of the Peninsula of Shantung, China, about 5 m. from the Bay of Kiauchau. The bay was seized in 1897 by a German fleet as the result of the murder of two German missionaries, and in 1898 Kiauchau became the center of a German protectorate of about 200 sq. m., on a 99-year lease. In August, 1914, Japan demanded the withdrawal of Germany from the district, thereby becoming involved in the general European War of that year. Kiauchau has an estimated population of 35,000.

Kick"apoo', a tribe of North American Indians. They lived in Wisconsin and are now removed to Kansas, Texas, Mexico and Oklahoma. They aided the English in the Revolutionary War and the War of 1812. There are now about 550 in the United States. They belong to the Algonquian family.

Kidd, William (about 1650-1701), a celebrated pirate, known as Captain Kidd. Hitherto an honest merchant, he became captain of the *Adventure* in 1696, and was sent out by the Earl of Bellomont, governor of Massachusetts, to put down the pirates that infested the Indian Ocean. Failing to meet any pirates, he took to piracy himself, and, returning to New York with his booty, was arrested and sent to London for trial. Though the charge of piracy against him could not be proven, he was found guilty of murder and hanged.

Kid'neys, the pair of excretory organs found in the body of vertebrate animals. The human kidneys lie in the abdominal cavity, one on each side of the middle line of the body, in the region of the middle rib. They are composed of a dense, reddish substance, easily crumbled. Each is shaped like a kidney bean, weighs from four to six ounces and is about four inches long, two inches broad and one and one-half inches thick. The outer surface is convex; the side lying toward the middle line of the body is concave and broken by a deep fissure. Entering this fissure is the renal artery from the aorta, which furnishes the blood supply; also a corresponding renal vein, which carries the blood out and into the inferior vena cava; and the pelvis, a large cavity into which the ureter expands. It is the function of the kidneys to collect from the blood certain poisons in the form of urea, which result from chemical changes in the system, and to pass these impurities out of the body. The urine passes from the kidneys, through the pelvis into the ureters, a pair of descending tubes, which empty it into the bladder. Here it is accumulated until expelled from the body. See BRIGHT'S DISEASE; GOUT.

Kieft, *Keeft,* **Willem** (?-1647), a Dutch colonial governor of New Netherland. He arrived in America in March, 1638. By his lack of discretion and ability, he inaugurated a period of storm and disorder in the colony. His treacherous policy towards the Indians resulted in a series of bloody massacres, which finally obliged him to consult the people, which he did through a board called the "Twelve Men." In 1647 he was superseded by Peter Stuyvesant. Kieft was drowned while on the return voyage to Holland.

Kiel, Canal, a ship canal across the Peninsula of Jutland. It is 61 m. long, and as originally constructed was 28 ft. deep and 85 ft. wide at the bottom. This canal was constructed by the German Government for military purposes and was completed in 1895 at a cost of $40,000,000. In 1910 work was begun on improvements, which included an increase of the depth and width and lengthening of the locks to 1090 ft. The estimated cost of the improvements was $55,000,000. Merchant ships are allowed to use the canal, and by so doing they avoid the long and dangerous passage around Denmark, shortening over 200 m. the distance between the Baltic Sea and the English Channel.

Kiev, *Ke' yef,* a city of Russia, the capital of a government by the same name. The oldest of the famous Russian cities, it is familiarly referred to as "the mother of Russian cities." It is situated on the Dnieper River, 670 m. s. of St. Petersburg. The three principal parts of the town are Old Kiev, Petchersk and the business quarter of Podol. The numerous ecclesiastical buildings date back to the time of the introduction of Christianity into Russia, when Kiev became the center of the new religion. Among the chief industries are milling, sugar refining, distilling and the manufacture of chemicals, paper, tobacco, hardware, machinery, etc. The trade is extensive and furthered by a stock exchange and a good harbor. Population, including the summer pilgrims, about 320,000.

Kill'deer", a bird of the Snipe and Plover Family, about the size of the robin (11 inches). It may be known by its olive-brown upper parts, bright yellow rump and sides of tail, and black- and white-banded head and breast. The nest is a slight depression in the bare ground in a meadow, and contains four, buff-brown and black-spotted eggs. Throughout the whole of temperate North America this little bird may be heard in meadow and on lake shores, its cheerful note "killdee," ringing out clearly at all times of the day. When the young are threatened, the old birds will use every device, including mimicking a wounded bird, to draw the intruder away from their vicinity.

Kil'ogram. See METRIC SYSTEM.

Kil'ogramme"ter, a unit of work in the metric system. It is the work required to raise a kilogram mass one meter against the force of gravity, and is equivalent to 7.233 foot pounds.

Kil'owatt", a unit of power in the metric system and equal to 1000 watts. It is the unit in which the powers of all large electrical dynamos and motors are stated. One-horsepower is equal to .746 of a kilowatt. See WATT.

Kilowatt Hour, a unit of work or energy in the metric system. It is the work done by a power of one kilowatt acting for one hour. It is the unit in which electric energy is usually stated. One-horsepower hour is equal to .746 of a kilowatt hour. See JOULE.

Kilpat'rick, Hugh Judson (1836-1881), an American soldier, born in New Jersey and educated at West Point. He first entered the artillery and was wounded at Big Bethel in June, 1861, three months later becoming lieutenant-colonel of cavalry. He especially distinguished himself at the second Battle of Bull Run and at Gettysburg, and was very active in the campaign against Atlanta in 1864 and in Sherman's march to the sea and through the Carolinas. Meanwhile, in March, 1864, he made a brilliant raid through Virginia. By the end of the war he was full major-general in the regular army. In 1868 and again in 1881 he was appointed minister to Chile.

Kim'berley, a town of the Cape Province, South Africa, situated midway between the Modder and Vaal rivers, 647 m. n.e. of Cape Town. It is the center of the South African diamond fields discovered in 1870, the value of the annual output of diamonds averaging about $25,000,000. A railroad, built from Cape Town, was opened in 1885. During the Anglo-Boer War, Kimberley was the scene of a siege lasting for several months. Population in 1904, 34,331.

Kin'dergar"ten, a school modeled more or less closely after one established about 1840 by Friedrich Froebel, at Blankenburg in the Thuringian Forest. A kindergarten is intended for children from four to six years of age; and the training which it affords has been found so advantageous that kindergarten methods have gradually extended their sway until they now dominate the best primary schools of the world.

The kindergarten recognizes that the normal child enjoys activity. It aims to use every impulse, desire, hope, interest or purpose of the child, to advance his skill in self-control and in effective self-expression, to give him through play some familiarity with the ordinary occupations of life, and to awaken in him a kind and loving spirit of helpfulness. While some have adhered more rigidly than others to the specific methods devised by Froebel, all kindergartners have the same general aims and seek to accomplish these mainly through games and songs, and by the use of objects called gifts. These are 11 in number, and were selected by Froebel with the utmost care. They serve to develop in the child's mind clear ideas concerning solids, surfaces, lines, points and construction materials. The kindergarten ordinarily occupies an attractive room, and its equipment includes a piano and low tables about which the pupils are seated in comfortable chairs when not engaged in games, singing or story-telling. The gifts consist of balls,

cubes, cylinders, quadrangular and triangular tablets of cardboard, or thin wood, and other materials for use in modeling, paper folding, weaving, etc.

The first permanently successful attempt to incorporate the kindergarten into the public school system of an American city was initiated at St. Louis in 1873 by Supt. William T. Harris and Miss Susan E. Blow. Today there are more than 6000 kindergarten teachers in those American cities having a population of not less than 4000, besides those of many private kindergartens. Many public normal schools maintain special departments for the training of kindergarten teachers, while many private institutions afford training of this character. The American Froebel Union, organized in 1867 and reorganized in 1885 as the Kindergarten Department of the National Education Association, has done much to promote public interest in kindergartens and in the ideas of Froebel. The efforts of this body are now being supplemented by those of the National Association for the Promotion of Kindergarten Instruction, which was incorporated in 1909 "to foster the intellectual, moral and physical training of children in the United States." See FROEBEL, FRIEDRICH; INDUCTIVE METHOD; HARRIS, WILLIAM TORREY.

Kin"emat'ics, that branch of mechanics which treats of the characteristics of different kinds of motion and of the modes of strain in elastic bodies without reference to the forces producing the motions or strains. The position of a body can be specified only by giving its distances from surrounding bodies; and when it moves a change occurs in its distances from these surrounding bodies. Since we cannot be certain that the surrounding bodies are fixed in space, all motion so far as we know it is only relative, and when we speak of a body as being at rest we simply mean that it has no motion relative to the surrounding objects, such as the earth's surface, which we may have chosen to regard as fixed in position.

When a body suffers two or more displacements or changes in position, its total displacement is the sum of the several displacements. For example, if a man moves three miles west and then moves four miles west, his total displacement is 3+4, or 7, miles west. But if he moves three miles west and then four miles north, his total displacement is the sum, in this case called the *vector sum,* of the two displacements; it is the distance from the beginning of the three miles to the end of the four miles, and, since in this case the two displacements are at right angles to each other, it is $\sqrt{3^2+4^2}$, 5, miles, its direction being nearly northwest. This principle of adding displacements, called *vector addition,* or *composition,* is perfectly general and applies equally as well for any number of displacements in any directions.

VELOCITY. The velocity of a moving body involves two things: the speed with which the body moves, as 5 miles per hour, and the direction in which it moves, as northwest, up, down, etc. The velocity with which a body moves may be the combined velocity, called the *resultant velocity,* of several separate velocities. For example, if a man rows a boat with a speed of four miles per hour and heads directly across a river, the current of which is two miles per hour, the resultant velocity of the boat may be found thus: Draw a line four inches long in the direction he rows; from the end of this line draw another line two inches long in the direction the river flows; join the beginning of the first line with the end of the second line and measure the distance in inches. It will be 4.47 inches, which, according to the scale chosen, represents a velocity of 4.47 miles per hour, and the direction of the line indicates the direction of the resultant velocity of the boat. The determination of a resultant velocity in this manner is called *vector addition,* or *composition of velocities,* and the method is the same as for the vector addition of displacements above.

ACCELERATION. When the velocity of a body is continually changing, the motion is said to be an accelerated one and

the rate of change of the velocity is called the acceleration. A train passes a certain station with a velocity of ten miles per hour, and three minutes later it passes the next station with a velocity of 40 miles per hour. In the three minutes it has gained a velocity of 40—10, or 30, miles per hour, and its acceleration is the velocity gained in unit time, or $\frac{30}{3}$, or 10, miles per hour per minute. It is better to use the same time unit throughout the entire problem, thus: 30 miles per hour equals $\frac{30}{60}$ equals .5 mile per minute, and the acceleration equals $\frac{.5}{3}$ equals .166 mile per minute per minute. Acceleration is said to be uniform when the velocity of a body changes by equal amounts in equal times, as is the case with freely falling bodies (See FALLING BODIES). If the acceleration is not uniform, as is frequently the case, an average acceleration can usually be determined and used for solving the problems involved. Acceleration may be added as vectors in the same manner as velocities and displacements above.

The velocity of a body may also be changed by altering the direction of motion without altering the speed. For example, if a stone is swung in a circle at the end of a string, its speed is practically constant, but the direction of its motion is continually changing and hence its velocity is continually changing. The stone is constantly pulled out of a straight-line course by the string, and the resulting motion is properly an accelerated one, the acceleration being toward the center of the circle. See MOTION, LAWS OF; FORCE.

The total distance a body moves in a given time is found by taking the product of its average velocity by the time. A man walking three miles per hour will travel 3x2, or 6, miles in two hours. If the motion is accelerated, the distance traveled in a given time can be found by mutliplying half the sum of the initial and final velocities by the time. In the case of the train mentioned above, the average velocity is $\frac{10+40}{2}$, or 25, miles per hour, or $\frac{25}{60}$ mile per minute, and the distance traveled in the three minutes is $\frac{25}{60}$ x 3, or $\frac{75}{20}$, or 1.25, miles. More complete formulas for accelerated motion are worked out in the article on FALLING BODIES.

APPLICATION. Displacements, velocities and acceleration may be *resolved,* as it is called, into convenient *components,* according to the same principles on which they are added or compounded. A single example will show the method. A man walks northwest with a velocity of five miles per hour; how fast is he moving west, or what is the westward component of his velocity? Draw a line five inches long in a direction northwest; from the first end of this line draw a line due north, and from the last end of the line draw one due east. The distance from the intersection of the last two lines to the last end of the five-inch line represents on the scale chosen the man's westward velocity, which is 3.535 inches, representing a velocity of 3.535 miles per hour. For a discussion of strain in elastic bodies, see ELASTICITY.

Kinet'ics. See DYNAMICS.

Kinetic Theory of Gases. See GAS.

Kinetoscope, *Ki ne' to skope.* See MOVING PICTURES; STEREOPTICON.

King, Clarence (1842-1901), an American geologist, born at Newport, R. I., and educated at Yale. From 1863 to 1866 he was a member of the California Geological Survey, and his work there, especially in the survey of the Cordilleran region, led to the organization of the United States Geological Survey, of which he was the first director. This position he held from 1878 to 1881, when he resigned because of ill health, continuing his work as a mining engineer until his death. His reports of his work and his published articles form a valuable authority on the geology of the West, and his work laid the foundation of modern methods of geologic survey. He attempted by a series of experiments to solve the problem of the age of the earth, but left this uncompleted. He was also the author of *Mountaineering in the Sierras,* a popular work of distinctive literary and scientific merit.

King, Rufus (1755-1827), an American statesman, born at Scarborough, Me., and educated at Harvard College. In 1777 he began the practice of law in Newburyport, Mass. He was elected to the Massachusetts Legislature in 1782, and to Congress in 1784. In 1787 he was a member of the Constitutional Convention, and helped to frame the Federal Constitution and to secure its ratification later by Massachusetts. Removing to New York in 1788, he was elected to the United States Senate from that state. From 1796 to 1803 he served with great ability as minister to England. In 1813 he was reelected to the United States Senate, serving until 1825, when he was again appointed minister to England, returning home the next year on account of his health. As orator and statesman King takes high rank among the noted men of his day.

King, William Lyon Mackenzie (1874-), a Canadian statesman, born in Ontario and educated at Toronto, Chicago and Harvard universities and in Europe. He was instructor in political economy at Harvard and also worked on the Toronto *Daily Globe*. He was the first deputy minister of labor of Canada, 1900 to 1908, and in this capacity conciliated over 40 industrial strikes. Meanwhile, he acted on various economic commissions. He was selected for North Waterloo (House of Commons) in 1908, and in 1909 became minister of labor of Canada. In 1910 he attended the Congress of Social and Industrial Insurance at The Hague.

King'bird", a bird of the Flycatcher Family. The kingbird, or tyrant flycatcher, is somewhat smaller than the robin (eight inches) and may be recognized by its slate-gray back, white under parts, blackish head and white-tipped tail. A bright orange crest is concealed in the feathers of the top of the head. Perhaps the most familiar characteristic of this bird is its tendency to fight, for it will attack, often without apparent reason, almost any bird, large or small, which approaches its vicinity. It has a special antipathy against crows and hawks, which it will fiercely pursue. Its usual position is on top of a telegraph pole or on the topmost branch of a tree. The kingbird feeds upon insects and, to some degree, upon bees, for which reason it is also called bee martin. The nest is a well-made structure of grass and weeds, and is frequently placed in a

KINGBIRD.

fruit tree, at a height of from 6 to 25 ft. above the ground. It contains three or four pinkish eggs with brown spots.

King Crab. See HORSESHOE CRAB.

King'fish"er, a bird of the Kingfisher Family. The belted kingfisher is considerably larger than the robin (about 12 inches) and is easily recognized by its grayish-blue head and back, white throat and under parts, blue belt across the breast and dashes of white on the wings and tail. The bill is large and heavy and resembles that of the woodpecker, and the head is heavily crested. This bird is an inhabitant of the borders of streams, ponds and other bodies of water where it may procure its food. This consists principally of fish, which it catches with great dexterity. The

nest is made in a sand bank at the end of a tunnel, which varies in length from four to nine feet. It is usually lined with fish bones, which have been ejected by the bird after the fish have been digested.

KINGFISHER

From five to eight white eggs are laid. It is said that the bird returns to the same nest year after year.

The kingfisher is also called the halcyon because of an ancient fable, which credited the bird with building a floating nest on the sea. It was thought that the bird had the power of stilling the sea while the eggs were hatching. This is one of the fables giving rise to the expression *halcyon days.*

King'let. The Kinglet Family comprises many small birds, the American species being smaller than the English sparrow and seldom exceeding four inches in length. Kinglets live in trees where they may be seen hopping about the twigs and branches in search of insects and uttering at intervals their cheerful song. The nest is a large ball of green mosses, lined with hair and feathers and suspended from small twigs in the top of a cone-bearing tree. The eggs, six to nine in number, are white with a large number of minute brown spots.

GOLDEN-CROWNED KINGLET. This kinglet has olive upper parts, whitish under parts, two white wing bars and a black crown encircling a yellow ring, inside of which is a central patch of orange. The female has the crown patch entirely yellow. This bird winters throughout the United States.

RUBY-CROWNED KINGLET. The body is grayish or greenish above and whitish below. The wings have two white bars and there is a bright red patch on the crown. In the female the red crown patch is lacking. The song is varied and beautiful.

Kings, First and Second, the two books of the English Bible which follow the two books of *Samuel* and precede the two books of *Chronicles,* forming a part of the historical group. In the Hebrew manuscript they are undivided, the division into two books being first made in the Septuagint version and later in the Vulgate. The books of *Kings* give the history of the kingdoms of Israel and Judah from the death of David to the Babylonian Captivity, covering a period of 427 years. Their authorship is uncertain. See BIBLE, subhead *The Old Testament.*

GOLDEN-CROWNED KINGLET

Kingsley, *Kingz' ly,* **Charles** (1819-1875), an English author and clergyman, born in Devonshire. After studying at Magdalen College, Cambridge, he entered the Church, becoming rector of Eversley, in Hampshire, in 1844. A few years later he was engaged in industrial work among the working classes, reproducing some of his opinions on problems of his day in the novels, *Alton Locke, Tailor and Poet* (1850) and *Yeast, A Problem* (1851). In 1860 he was appointed professor of modern history at Cambridge, became canon of Chester in 1869 and, later, canon of Westminster. Kingsley was a versatile student, an eloquent preacher and a clear and forceful writer, capable of giving vivid and splendid descriptions and narrating incidents with dramatic power. Among his best-known works are *Hypatia, Westward Ho! The Water Babies, At Last* and *Message of the Church to Laboring Men.*

King's Mountain, Battle of, one of the most picturesque and decisive battles of the Revolutionary War, fought some 30 m. southwest of Charlotte, on the border between North and South Carolina, Oct. 7, 1780. The struggle took place between a detachment of Cornwallis's army, 200 regulars and 1000 Tories, under Ferguson, and an overwhelming force of backwoodsmen from what is now Tennessee. Being entrapped, the British stationed themselves on top of King's Mountain, which is about 1000 ft. high; but the backwoodsmen scaled the peak on all sides. They killed and wounded nearly 400 English and captured the rest. The Americans lost 30 killed.

Kingston, *Kingz' tun,* a city of Canada, capital of Frontenac County, Ontario, is situated at the mouth of the Cataraqui River on the northeast shore of Lake Ontario, and on the Grand Trunk and other railroads, about halfway between Montreal and Toronto. The city is at the eastern end of the Bay of Quinte, and its harbor is sheltered by Amherst, Simcoe and Wolfe islands. The position near where the waters of the lake enter the St. Lawrence River, and its connection with Ottawa by means of the Rideau Canal, make Kingston a city of great military importance in eastern Canada. During the summer months a line of steamships connects the city with ports on both the Canadian and American sides, and its proximity to the Thousand Islands brings a good many summer tourists.

The chief buildings include the Anglican and Roman Catholic cathedrals, two large hospitals, the provincial penitentiary, the insane asylum, Royal Military College, the artillery school, the school of mining and agriculture, and Queen's College. The excellent harbor affords opportunity for extensive shipbuilding, and there is a stone graving-dock, 280 ft. long, 100 ft. wide and 16 ft. deep at low tide. The manufactures include engines, locomotives, railway cars, edge tools, hardware, cotton fabrics and spirituous liquors.

Kingston was the camping ground of the Indians for centuries and has been an important military post since 1673, when it was visited by Frontenac, French governor of Canada, in company with La Salle. A fortification built of wood, surrounded by palisades, was constructed at that time and was the origin of Ft. Frontenac at Cataraqui, which was the first fort on the lower lakes west of Montreal. It remained a French fort until 1758, when it was taken by the English. At the close of the Revolutionary War it was made the center of a Loyalist settlement and named Kingston in honor of George III. It took an important part in all the wars between the French and English, and in the War of 1812 it was the headquarters of the British naval force in Lake Ontario. Population in 1911, 18,874.

Kingston, the capital of the Island of Jamaica, located upon the south coast and upon a magnificent harbor, the shores of which are formed by the gently-sloping Blue Mountains. The town is built about the bay and has wide, pleasant streets, lined with delightful houses having large covered verandas

below and long balconies overhanging the streets. The principal buildings are the churches, the courthouse, a hospital and the government buildings. The city is a commercial port of importance. The harbor is defended at its entrance by two fine forts. Kingston was founded in 1693. It has been visited by many disastrous fires and earthquakes, the last of which destroyed almost the entire city. Population, 57,379.

Kingston, N. Y., a city and county seat of Ulster Co., 88 m. n. of New York and 53 m. s. of Albany, on the west bank of the Hudson River, at the mouth of the Rondout Creek, and on the West Shore, Ulster & Delaware, Wallkill Valley and Ontario & Western railroads. The city is also connected with the New York Central & Hudson River Railroad on the east by ferry across the Hudson at Rhinecliff. The city is a port for the Day Line steamers between New York and Albany. There is also night-line steamer service between Kingston and New York. The city is historic and picturesque. The principal part of it is built on a level plateau 150 ft. above the river. To the northwest is the world-famed scenery of the Catskills, to the southwest the Shawangunk Mountains and Lake Mohonk, the home of the annual arbitration and peace conferences (See MOHONK LAKE, N. Y.). Kingston has many miles of well-paved streets, shaded by great trees, and there are fine country drives to the smaller towns and villages. Kingston Point Park of more than 50 acres is located directly on the river and is the landing place of the Hudson River Day Line steamers. This park is a favorite excursion resort.

The city contains a fine city hall, with a Soldiers' and Sailors' Monument, Federal Building, business college, Wiltwyck D. A. R. Chapter House, Twaalfskill Clubhouse, a state armory and a Y. M. C. A. Building. The Senate House, now the property of the state, with a colonial museum, was the meeting place of the first State Senate in 1777. The educational institutions include Ulster and Kingston academies and a city library. Among the charitable institutions are a city hospital, Benedictine Sanitarium, the Tuberculosis Hospital, the Industrial Home for children and a Catholic orphanage.

Kingston has over two miles of water front, and with its transportation facilities is the commercial center for a large extent of country. The city has an important trade in coal, cement, lumber, brick and bluestone, and large manufactories of street-railway cars, automobiles, motor trucks, tobacco, cigars, lace curtains, brushes, sash and blinds and machine-shop products. There are also large boat-building yards.

A small fort was built by the Dutch at the mouth of the Rondout Creek in 1614, and in 1652 a settlement was established in the vicinity and named Esopus after the Esopus Indians. Peter Stuyvesant, the first Dutch governor, selected the site for the village and named the placed Wiltwyck. On July 1, 1667, the settlement passed into control of the English and was renamed Kingston in honor of the family seat of Lovelace, the first English governor. On Oct. 17, 1777, Kingston was burned by the British under General Vaughan. Kingston was the first capital of New York. The city was incorporated in 1872, the villages of Rondout and Wilbur being included. Population in 1920, 26,688.

Kio'to. See KYOTO.

Kip'ling, (Joseph) Rudyard (1865-), an English poet and novelist, born in Bombay, India. He was educated in the United Service College in England and returned to India at the age of 17, becoming subeditor of the Lahore *Civil and Military Gazette*. Between 1886 and 1889 he published several volumes of poems and stories, and on his return to England, after traveling throughout India, China, Japan and America, found himself famous. In 1898 he visited South America. He was awarded the Nobel prize in literature in 1907. His early fiction is characterized by careless freedom, freshness of atmosphere and a great variety of char-

acters. The romance of India is revealed through the magic of his pen; his soldier types, Mulvaney in particular, are unforgetable. He was energetic and vigorous, and his barrack-room ballads and war songs reflect the enthusiasm of a man in love with living. His is the message of courage, of brute strength. In some of his later productions, however, where he opposes imperialism, the preaching spirit of his works makes them inferior to the earlier ones. His novels and short stories include *Plain Tales from the Hills, The Light That Failed, The Naulahka, Many Inventions, The Jungle Book, Captains Courageous, Kim* and *Puck of Pook's Hill.* His collections of poems include *Barrack-Room Ballads, The Seven Seas* and *The Five Nations.* Among single poems is the incomparable *Recessional.*

Kirk'wood, Samuel Jordan (1813-1894), an American politician, born in Harford County, Md. He was educated in Washington, D. C., studied law in Ohio and was admitted to practice in 1843. In 1855 he moved to Iowa and became a manufacturer, was made governor in 1859 and at the close of the Civil War became United States senator. He served again as governor for one term from 1875, and then again took a seat in the Senate. He was a member of Garfield's cabinet as secretary of the interior, and in 1882 retired.

Kit Carson. See CARSON, CHRISTOPHER.

Kit-Cat Club, a club founded in London, about 1703, by wits, painters, politicians and writers of Whig principles. The name was taken from that of Christopher Cat, who kept a pie-house in Shire Lane, near Temple Bar. It was in this house that the club first met, but later the meetings took place at the Fountain Tavern in the Strand, and still later in a room at Barn Elms, the residence of the secretary. Among the members were the Duke of Marlborough, Sir Robert Walpole, Congreve, Steele and Addison. The portraits of many of the members were painted by Sir Godfrey Kneller.

Kitchen Cabinet, a jocular name applied to a coterie of personal friends of a president of the United States who hold no office, but whose advice is supposed to be secretly sought by the chief executive. The term was first applied during the administration of President Andrew Jackson, of whom it was charged that he valued the opinions of his early friends above the advice of the members of his cabinet.

Kitch'ener, Horatio Herbert, VISCOUNT KITCHENER (1850-1916), a noted British general. He served in Egypt and took a distinguished part in the expedition sent to the relief of General Gordon in 1884. In 1898 he completely destroyed the power of the Mahdi, and was rewarded by a vote of $150,000 by Parliament, while Queen Victoria raised him to the peerage. A little later he raised $500,000 to found the college at Khartum in memory of General Gordon. He assumed command of the war in South Africa in November, 1900, and won an honorable peace in May, 1902. In recognition of this, he was made viscount. On the breaking out of the great war of 1914 he was appointed Secretary of State for War. He devoted all his energy to organizing the forces of Great Britain, assembling supplies, and raising and equipping a suitable army. He was one of the few that recognized the magnitude of the struggle then opening in Europe.

Kitchen Mid'dens, a name applied specifically to the mounds of refuse left by prehistoric settlements along the coast of Denmark. They have been found to contain quantities of fish shells and bones of fish and wild animals and relics of implements made of bone, stone, horn or wood and fragments of pottery. Similar mounds occur in various localities containing remains characteristic of the region, and their formation is still going on in places where savage conditions prevail.

Kite, a name applied to certain birds of prey belonging to the Falcon Family and having very long, narrow, pointed wings, weak feet and usually a forked

tail. The birds are graceful flyers, and the different species, though most numerous in warm countries, are found in many parts of the world. Four species are found in the United States, of which the swallow-tailed kite is perhaps the most interesting. It is about two feet long; the wings are long and slender; and the tail is forked and nearly

KITE

as long as the wings. The general color is white, with which the black back, wings and tail are in strong contrast. The nest, built in tops of tall trees, is usually made of grass and contains one to four brown-spotted eggs. Kites spend most of the time on the wing, even carrying their food, which consists mainly of reptiles and insects, in their talons, and eating it as they fly.

Klon'dike, a small shallow river of northwestern Canada, having its entire course of about 120 m. in the Territory of Yukon. It is a tributary of the Yukon, flowing into it from the east, and at the confluence of the two rivers the city of Dawson is situated. The Klondike basin is noteworthy because of placer gold mines located in this region, and to this river in 1896 came a rush of gold seekers, who founded Dawson and made it temporarily a thriving city. The basin of the Klondike is well forested and has pleasant summers but severe winters. Garden vegetables and some grains are raised in the cultivated areas. The yield of gold from the Klondike is estimated at about $20,000,000 annually.

Klopstock, *Klope' shtoke,* **Friedrich Gottlieb** (1724-1803), a German poet, born in Quedlinburg. He went to Jena in 1745 to study theology, but removed to Leipsic the following year. In 1748 the first three cantos of his *Der Messias* were published, but the religious epic was not completed until after he had removed to Zürich and later to Copenhagen, where he went by invitation of the Danish king. He returned to Germany in 1771, and the last five cantos were issued in 1773. His theme was the Redemption and he executed it with a laudable earnestness, but, although he conceived of magnificent passages, he was unable to lend to the whole epic the spirit and the wealth of material required to make it a masterpiece. He also wrote *Art of Poetry, The Death of Adam, Wingolf* and *Odes.*

Klotz, *Klotes,* **Otto Julius** (1852-), a Canadian scientist, born in Ontario and educated at Toronto and Michigan universities. He entered the government service in 1879, remaining until 1908 with the department of the interior, Ottawa. He was then made assistant chief astronomer to the department. Previously, in 1884, he made a canoe trip of 2000 miles along the Saskatchewan and Nelson rivers to Hudson Bay, en-

countering relics of Sir John Franklin and making various magnetic observations. Later he published a magnetic chart in connection with the discussed position of the magnetic pole, and began transcontinental longitude determinations. Besides making an accurate survey of the Canadian Pacific through the Rockies and the Selkirks and first determining the height of many of the peaks along the way, he was associated with the trans-Atlantic longitude work, was active on the Alaska boundary survey and ascertained the longitude of the Pacific Islands from Vancouver to Brisbane, Australia. Dr. Klotz has written widely on professional subjects.

Knapsack, *Nap' sak",* a bag or sack in which a soldier carried extra clothing. This was really the soldier's traveling bag. Here would also probably be found his letters, brushes, buttons, needles, thread, etc. The soldier on the march ate from his haversack and lived in his knapsack. The blanket roll is now more commonly used than the knapsack.

Knights of Columbus, a Catholic fraternal and beneficial order organized in New Haven, Conn., Feb. 2, 1882. On March 29 of the same year it was incorporated under the state laws. Applicants of from 18 to 60 years may take out policies in it ranging from $1000 to $3000. Chapters are installed in every state in the Union, besides in Quebec, Ontario, Prince Edward Island and New Brunswick. An associate court has been recently established in Manila. All told, the Knights of Columbus claim nearly 1,500,000 members. In 1904 they presented the Catholic University of Washington with $50,000 for an endowed chair of American history.

Knights of Labor. See LABOR ORGANIZATIONS.

Knights of Pythias, *Pith' i as,* a fraternal, secret order whose purpose is the exemplification of true friendship and the maintenance of a system of life insurance. It was organized in Washington in 1864. Page, esquire and knight are the degrees conferred. The supreme lodge has general charge of the order, and of the Uniform Rank and the insurance branch. About $29,000,000 is paid annually for death claims. There are over 708,000 members.

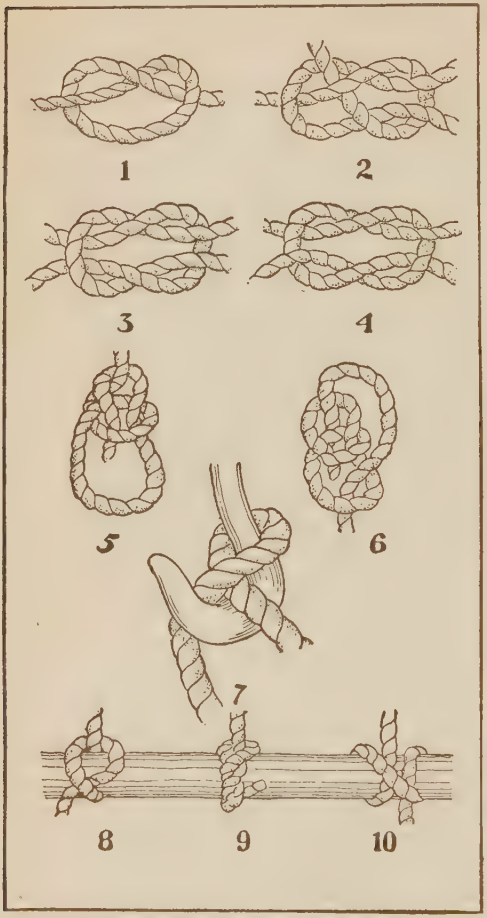
Knights Tem'plars. See TEMPLARS, KNIGHTS.

Knitting Machine, a machine for making hosiery and underwear. A machine, known as the stocking frame for knitting, was invented by William Lee of Nottinghamshire, England, in 1589. Up to the 19th century all knitting machines were operated by hand. The first power machine put up was in Albany, N. Y., in 1831, and during the 19th century over 2000 patents in knitting machines were taken out in the United States alone. The machine, as commonly used, is circular in shape, and knits a circular web and has a series of needles with hooks at their ends arranged vertically and parallel to each other inside of a vertical cylinder, which raises and lowers them to make a loop at will. Knitting machines are used in making cotton, woolen and silk fabrics, principally for underwear.

Knot, *Not,* a fastening by which the ends or parts of one or more threads, cords or ropes may be twisted or looped around some other object so as not to come apart readily. Nearly 200 different kinds of knots may be enumerated, mostly used on shipboard, where the art of tying knots is important and frequently requires skill in their adjustment. The use of wire cables in place of ropes on large ships has, however, largely done away with the art. The following knots, shown in the illustration on the next page, are convenient for many purposes. In the illustration, 1 represents the overhand knot; 2, the sheet knot; 3, the square knot; 4, the granny knot; 5, the bowline; 6, the running bowline; 7, the single blackwall hitch; 8, the half hitch; 9, the timber hitch; and 10, the clove hitch.

Knot'grass", a number of slender weeds of the Buckwheat Family, having cylindrical, jointed stems. They are common on waste ground or in cultivated fields, where they grow in a thick

mat close to the ground, seemingly uninjured by the trampling or browsing of animals. The leaves, which are thin and narrow, are borne on short stems at the joints of the main stalk and are partially enclosed in pale brown sheaths. The



KNOTS IN COMMON USE

flowers are pink, greenish or white and are generally clustered on slender spikes. There are four or five sepals, no petals, and eight stamens. There are several species common in the United States.

Knowles, *Nolez,* **James Sheridan** (1784-1862), an Irish dramatist and actor, born in Cork. He was educated in London, and, after holding a military commission, became an actor. Later he taught elocution in Belfast and Glasgow, and began his career as a writer of successful plays. In 1845 he joined the Baptists, distinguishing himself as a religious worker. Among his plays are *The Hunchback, The Wife* and *The Love Chase.*

Know-Nothings. See POLITICAL PARTIES IN THE UNITED STATES, subhead *American Party.*

Knox, *Nox,* **Henry** (1750-1806), an American Revolutionary patriot and soldier, born in Boston, Mass. He enlisted in the army at the beginning of the Revolution. He brought 55 cannon overland from Ticonderoga for the defense of Boston, and served with great efficiency throughout the war, engaging at Bunker Hill, Brandywine, Germantown, Monmouth, Trenton and Yorktown. In 1785 he was appointed secretary of war, which position he held nine years, part of the time administering the navy department.

Knox, John (about 1513-1572), a Scotch Christian reformer, born at Giffordgate, Haddington. He began his career as a strong supporter of the Reformation. While preaching to the beleaguered Protestants in St. Andrews Castle, he was taken prisoner, and served for some months as a galley slave. Later he became chaplain to Edward VI of England. When Mary succeeded to the throne, Knox fled to Scotland, but continued his influence in England.

Knox, Philander Chase (1853-1921), an American statesman, born at Brownsville, Pa., graduated at Mt. Union College, Alliance, Ohio, 1872. He was Attorney-General in Pres. McKinley's Cabinet, Secretary of State in Pres. Taft's Cabinet, U.S. Senator from Pennsylvania from 1901 to 1909, re-elected senator in 1916, and was serving as such at the time of his death. He stood high in the councils of the Republican Party, was one of the leaders in the senate's opposition to the Treaty of Versailles, and was the author of the Knox Resolution, designed to end the technical state of war with Germany, which was finally passed in the Special Session of 1921. He favored a court of arbitration at The Hague, and

the appointment of a Central American Court of Justice.

Knoxville, Tenn., the third city of the state and the county seat of Knox Co., in the east-central part of the state on the Tennessee River, and on the Southern, the Louisville & Nashville, the Knoxville, Sevierville & Eastern and other railroads; it is 180 m. e. of Nashville and 200 m. by river n.e. of Chattanooga. Knoxville is situated in a region of rolling hills, with the Smoky Mountains of the Allegheny system near by at the east, and the beautiful Cumberland Mountains at the west. The climate is delightfully cool in summer, thus making Knoxville a pleasant residence or resort city the year round. There are 40 m. of asphalt streets, all others being macadamized, and there are many handsome residences and fine business blocks. Aside from the attractive drives around the city there are three pleasant parks, Chilhowie, Circle Park and Emory Place; the Sevier, the Boyd, the National and the Confederate monuments are graceful memorials that beautify the public grounds.

Knoxville has especially pleasing and important public buildings. There are the marble customs-house and post office; the county building, occupying attractive grounds; the Lincoln Memorial Hospital and Knoxville general hospital; commodious railway stations; Y. M. C. A. and Y. W. C. A. buildings; a large Auditorium; numerous club buildings, including the Cumberland Club, the Woman's Building, the Board of Commerce Club, the Country Club, the Elks' Home, Eagles' Home, and many others; an interesting city market; and several excellent hotels. The many churches are of modern architecture and are exceptionally well attended.

The City Schools of Knoxville now embrace thirty-eight separate buildings with three hundred and seventy-five teachers and 13,500 pupils. There are five high schools in the city—Central High School; Park City High School; Oakwood High School; and the Lonsdale High School and the Colored High School. Among the other institutions are the University of Tennessee, with its beautiful campus and its large summer school for teachers, the Tennessee State Deaf and Dumb School, and the Knoxville College for negroes.

INDUSTRIES. The region about Knoxville is rich in mineral and agricultural resources. Iron ore, marble, zinc, coal, copper, clays, corundum and lead supply raw products and cheap fuel for the many manufacturing enterprises. The valuable forests of poplar, oak, pine, cherry, walnut, chestnut, locust and elm, and excellent orchards and gardens add to the city's enterprises. The industries include the weaving of textiles and the manufacture of marble, bricks, pottery, stoves, plows, powder, furniture, mantels, trunks, clothing and many food products. There are also immense machine shops, rolling mills, railway shops, wholesale houses and extensive zinc works.

Knoxville was first settled in 1787 and was named after Gen. Henry Knox, the Revolutionary soldier. It was organized as a town in 1794 and was the capital of the "Territory South of Ohio" from 1792 to 1796. When Tennessee was admitted to the Union, Knoxville was its capital until 1811. It became a city in 1815. In the Civil War the city was the scene of many important engagements and was held at various times by the Confederate and by the Federal troops. Population in 1920, 77,818.

Ko'be, a seaport of Japan located on the southeastern coast of the Island of Hondo, on the Bay of Osaka. In 1892 it was united with the town of Hiogo and the two together form a thriving commercial center. It connects directly by steamship line with China, Hongkong, Australia, Europe and the United States. It has fine wharves, shipyards, docks and beautifully-kept streets. Kobe has been opened by treaty to foreign commerce and has a large foreign population, foreign newspapers and banks. Many beautiful and interesting spots are easily accessible from Kobe, and the climate is especially fine. Population, 378,197.

Koch, *Koke,* **Robert** (1843-1910), a German physicist and bacteriologist, born at Clausthal, Hanover. After completing his university course he began the practice of medicine and soon attracted notice by his researches in bacteriology. For his study of anthrax and other communicable diseases Koch was in 1880 appointed a member of the Imperial Board of Health of Berlin. To continue this work Koch found it necessary to discover new laboratory methods and to improve appliances for use in his microscopical work; in this way alone he gave invaluable aid to the study of bacteriology, a science for which he himself laid the foundation. Sent to India and Egypt to study cholera, Koch there announced his theory of a specific cholera germ, a theory which he afterward demonstrated. Later he discovered a useful test for tuberculosis and a cure for malaria and one for the sleeping sickness of Africa. Koch became a professor in the University of Berlin in 1890, and in 1906 received the Nobel prize for medical research. His numerous published works are of inestimable value to laymen as well as to the medical profession.

Ko'hinoor", a famous diamond belonging to the British sovereign. It was presented to Queen Victoria in 1850 by the East India Company. See DIAMOND.

Ko'komo, Ind., a city and county seat of Howard Co., 54 m. n. of Indianapolis, on the Wildcat River and on the Lake Erie & Western, the Toledo, St. Louis & Western, the Pittsburgh, Cincinnati, Chicago & St. Louis and other railroads. Kokomo is the chief town in the natural-gas territory of Indiana and is primarily a commercial and manufacturing city. The manufacturing establishments include plate, table and opalescent-glass works, potteries, pulp and paper mills, automobile and electrical-appliance works, steel mills, rubber-goods factories, bits and range works, sash and blind factories and nail and rod mills. The place was settled in 1844, incorporated in 1845 and chartered as a city in 1855. Population in 1920, 30,067.

Ko'la. See COLA.

Ko'mura, Jutaro, COUNT (1855-1911), a Japanese diplomat, born at Hyuga. He graduated from Harvard in 1877, and seven years later entered the foreign office in Tokyo. As *chargé d' affaires* in Peking and as minister in Seoul, Washington, St. Petersburg and Peking, he won distinction as a diplomat, and in 1901 he received the portfolio of foreign affairs. This post he filled during the war with Russia, meeting the Russian plenipotentiaries at Portsmouth, when the treaty was signed there in September, 1905; he also met the Chinese delegates at Peking, when a treaty was concluded at that place some two months later. In appreciation of this and of service rendered in connection with the second Anglo-Japanese alliance, Komura was made a count, and he was also honored highly by England. In 1906 he became privy councilor, being later transferred to the London embassy. He resumed the portfolio of foreign affairs in Tokyo in 1908.

Koo'tenay River, a river of British Columbia rising on the western slopes of the Rocky Mountains, flowing south into Montana and Idaho, then northwest into British Columbia again, finally entering the Columbia near Robson. The Valley of the Kootenay is a rich gold-mining region, and the river is useful for navigation. Its length is 450 miles.

Ko'ran, the bible of Mohammedanism. The Mohammedans, or Moslems, believe that this book has always existed with God, and that it was first written in rays of light on great tablets, which were forever in the presence of God. During a period of 23 years portions of this writing were revealed by Gabriel to Mohammed, who preserved them. The manuscripts were originally written in excellent Arabic, but without the topical arrangement. After the death of Mohammed, Abu-bekr (633), his successor, caused the manuscripts to be rearranged and classified, and still later, in 652, Caliph Othman had the work revised and divided into 114 chapters. See MOHAMMEDANISM.

Korea, *Ko re' a,* a great peninsula of eastern Asia projecting from northeastern China and separating the waters of the Japan Sea from those of the Yellow Sea. Politically it includes many islands of the Yellow Sea and of the Straits of Korea and the Island of Quelpaert. The peninsula itself is about 50 m. in length and has an area of 82,000 sq. m., about the same as that of Minnesota.

PHYSICAL FEATURES. Korea is a rugged, mountainous country having a central range that slopes gently away to western plains but which in the east forms precipitous cliffs that reach the coast, rendering it almost inaccessible; there are, however, a few excellent harbors.

PRODUCTS. The rivers have made the western slopes fertile, and in the north grains are raised, while in the south, cotton, rice, tobacco, millet, beans and ginseng form the important crops. The last is always in demand in China and Japan. Fruits are easily raised, but are likely to be flavorless. The uncultivated regions bear great forests of pine, fir, oak, maple, birch and ash. Iron, coal, silver, gold and copper have long been known to exist in the mountains but only recently have been mined. At present gold-mining privileges in Korea are held by the Americans, Russians, English, French, Germans and Japanese. Stock raising is an important industry and cattle, horses, pigs and goats are pastured in great herds in the fertile valleys. Manufacturing has never proved a paying industry and has consisted chiefly in such comparatively simple productions as grass mats, hemp rope, bamboo screens, inlaid ware and a paper from which hats, umbrellas, sacks, coats and even doors are made. In Seoul a match factory has recently been started and has proved profitable. Notwithstanding the primitive means of communication, trade, especially with Europe and the United States, is rapidly increasing, and nine ports, including Seoul, have been opened to foreign commerce. The principal exports are rice, beans, gold, copper and hides.

PEOPLE, HISTORY AND GOVERNMENT. The Koreans are of the Mongolian race, somewhat larger than the Chinese; their language is a mixture of Japanese, Chinese and Mongol, but their customs are more especially like those of China. Among the noble classes the women are not given great freedom, but elsewhere they are under few restrictions. In religion the Koreans are chiefly Buddhists or follow a form of spirit worship. There are some followers of Confucius, and Christianity, though at first bitterly opposed, is now making some progress.

Korea is an old country; it was a thriving empire during earlier times, but in the Middle Ages came under Chinese control, and was obliged to pay tribute to the Chinese Government. It has been many times taken by the Japanese, but was returned each time to China. During the Russo-Japanese War, Korea was cut off from the outside world and was the battleground of many of the conflicts. In 1904, the Japanese promised their protection to the Koreans and to their country. In August, 1910, the Korean ruler was finally deprived of all political power, and the country became a part of Japan. It is made up of 14 provinces and 360 districts. Population, 13,125,100.

Kosciusko, *Kos" i us' ko,* **Thaddeus** (1746-1817), a Polish noble and patriot, born in Lithuania. He received a military schooling at Warsaw and later, at the expense of the State, studied in France. When he came to America, in 1776, Washington appointed him a colonel of engineers and one of his aides. He afterwards became a brigadier-general. Kosciusko returned to Europe after the war and spent several years in retirement. In 1789 he became commander-in-chief of the liberating army in his home country, and some five years later defeated, with great slaughter, the Russians under Denisoff at Raclawice, near Cracow. At Maciejowice, however, he himself suffered defeat, was wounded and made a prisoner. He remained in a dungeon at St. Petersburg for two

years; but was released when Paul I of Russia was crowned. He then visited the United States, where he was warmly welcomed. He also visited England, but most of his remaining days were spent in France. Kosciusko liberated all his serfs just before his death, which occurred in Switzerland.

Kossuth, *Kos sooth',* **Louis** (1802-1894), a Hungarian patriot and statesman. He became a zealous political reformer. His independent statements as an editor in 1837 led to his imprisonment for three years, but his editorials lost none of their fearlessness after his release. In 1848 he was elected governor of the new republic, but when the Hungarians were defeated by the Austrians, Kossuth found refuge in Turkey. He visited England and the United States in 1851, and though he was greeted with great enthusiasm by the people of both countries, he failed to enlist help for the cause of Hungary. He finally settled in Turin, where he died. He wrote *Memories of My Exile.*

Koumiss, *Koo'mis.* See KUMISS.

Krem'lin, the Russian name for the citadel of any town or city, but especially for that of Moscow. The Kremlin of Moscow is an inclosure of 100 acres surrounded by a wall 8000 ft. in extent, guarded by stately towers and entered by means of five immense gateways. Other kremlins of interest are those of Novgorod and Rostov.

Kronstadt, *Krone' shtaht,* or **Cronstadt,** a naval station of Russia, situated in the Gulf of Finland on the Island of Kotlin, 31 m. w. of St. Petersburg. The fortifications are strong and its three harbors accommodate 1000 vessels. Kronstadt is the seat of the admiralty, and one of the sights of the town is the house occupied by Peter the Great when he founded the station in 1710. The industries are represented chiefly by sawmills and machine works. Population, 60,000.

Krupp, Alfred (1812-1887), a Prussian inventor and manufacturer, born at Essen, Prussia. He inherited the steelworks at Essen from his father, who founded them. Krupp made persistent efforts to improve the manufacture of steel, and his exhibits at London in 1851 brought him to the notice of the world. His inventions include armor plate and the breech-loading rifle and cannon. The latter were adopted by Prussia in 1861, and proved their superiority in the Franco-German War. Krupp manufactured for nearly every European nation except France.

Krupp, Friedrich Alfred (1854-1902), a German gunmaker, called the "Cannon King." He increased and diversified the output of the Krupp works at Essen, inventing a new bessemer steel, from which he devised rifles, cannons and seamless tires; and hardening armor plate by a new method. His generosity to his employees was admirable. Krupp was a member of the Prussian upper house and Council of State, and sat in the Reichstag. He was the richest man in the empire at his death.

Kryp'ton, a dense gaseous element discovered in 1898 by Ramsay. Like argon, helium and neon, members of the same group, krypton is very inert and is not known to unite with any other element. Its occurrence in the air is estimated as about one part in one million.

Ku'belik, Jan (1880-), a Bohemian violinist, born near Prague, in the Conservatory of which he received his musical training. He began his public performances when he was 18 years of age and soon after made a tour of England and the Continent. He has visited America, where he was well received. His mastery of his instrument and his skill in execution are especially marked.

Kublai Khan, *Koo" bli Kahn',* or **Khubilai Khan** (1216-1294), founder of the Mongol dynasty of China. Being ordered by his brother, Mangu, then grand khan of the Mongols, to subjugate Korea and China, in 1260 he entered China, dispersing the Tartars and possessing the northern country. Immediately he adopted the Chinese mode of civilization, and ingratiated himself by patronizing learning and honoring former monarchs. In 1279 he subdued southern

China and founded the Yuen dynasty. His was the largest domain ever governed by one monarch, and the grand dukes of Russia were among his tributaries. Marco Polo visited his court.

Kuenlun, *Kwen" loon',* **Mountains,** a range of central China lying between the Himalayas on the south and the Thian Shan range on the north. At the west they form a definite chain, but as they wind eastward they are broken into intersecting ranges and high plateaus, most of which have not been explored. The highest peaks are in the central section and are thought to be at least 26,000 ft. in height. Great glaciers cover many of their slopes, and mountain passes crossing these are frequently 16,000 ft. in elevation.

Ku'-Klux" Klan, a secret society which exerted considerable influence throughout the Southern States immediately after the Civil War. Its purpose was to prevent the newly-emancipated negroes from exercising their rights as citizens. The Klan terrorized the colored people by working upon their superstitious fears, and there were also many cases of bodily injury. The same methods were employed, whenever possible, upon the Carpetbaggers (See CARPETBAGGERS) from the North who encouraged the negroes to exercise their political rights. In 1871 Congress took active measures to break up the organization, but so secret were its operations that it was difficult to secure evidence against members. It was later disbanded, having never received the support of the better element in the South.

Ku'miss, or **Koumiss,** an intoxicating, fermented drink originally prepared from the milk of the mare or the camel, and now to a certain extent made in the United States from cow's milk. The drink is of Mongolian origin and by Eastern peoples is regarded as a stimulating beverage, in spite of its intoxicating effects. That made in the United States is said to contain proteids, milk sugar, and fat in varying quantities. Physicians prescribe it in small quantities to invalids who can take little food.

Kum'quat, a small variety of orange tree producing a fruit also known as the kumquat. It is grown in Japan, in Florida and California, and to some extent in conservatories in England. The fruit is small, has a bitter rind and a sweet, juicy pulp. It is chiefly used in making preserves and desserts.

Kurdistan, *Koor" di stahn',* a region of western Asia, having indefinite boundaries and comprising the territory roamed over by the Kurds, from whom the region takes its name. Politically Kurdistan is shared by Turkey and Persia, since it lies within the boundaries of the two countries. The country is mountainous and is watered by the Tigris and the Greater and Lesser Zab rivers. The chief occupation is cattle raising, though fruits are grown in abundance. The Kurds are a roving race, Mohammedan in their religion and extremely hostile to Christians. The principal cities are Diarbekir and Bitlis. Population, probably about 2,000,000.

Kurile, *Koo' ril,* **Islands,** a chain of islands in the northern Pacific stretching from Kamchatka to Japan. Their total area is 6100 sq. m., and they extend for nearly 550 m. The surface is mountainous and rugged, and iron, copper and sulphur are mined. The natives, who are chiefly Kamchatkans, are principally engaged in fishing and in trapping the many fur-bearing animals that are found. Population, about 2000.

Kuroki, *Koo' ro kee,* **Itei,** COUNT (1844-), a Japanese soldier, born in Satsuma, Japan. He was colonel in the Satsuma Rebellion of 1877, distinguished himself in the Chino-Japanese War of 1894-5 and was made general in 1903. During the Russo-Japanese War of 1904-1905, he added to his distinction by his rapid conquest of Korea and his services at Liaoyang and Mukden. Count Kuroki was made extraordinary inspector-general of the army in 1906.

Kuro Siwo, *Koo' ro She' wo,* or **Japan Current,** the warm stream of the Pacific Ocean, corresponding in relative position and movement to the Gulf Stream in the Atlantic. The Kuro Siwo, how-

ever, has a lower temperature and a more feeble current than the Gulf Stream. The mean summer temperature is about 72° F., the winter temperature, about 63°. A branch of the Kuro Siwo starts from the Bay of Bengal, but the greater part of its waters flow among the Malaysian Islands. It passes northward along the coast of Japan, where it becomes a drift. In summer it extends as far north as the Kurile Islands, but no part of it enters the Arctic Ocean, as formerly supposed. It drifts eastward and reaches the North American coast off British Columbia and flows southward to about the Mexican border. It exerts a strong influence over the climate of the Pacific coast region of North America.

Ky'anite, or **Cyanite,** *Si' a nite,* a mineral belonging to the Granite Family, occurring in the form of long-bladed crystals or massive. It is transparent, or partly so, and of varying shades of blue. The finer grades take a high polish and are valuable for inkstands, paper weights, table tops and other such objects. The best specimens come from Switzerland.

Kyoto, *Kyo' to,* or **Kioto,** the former capital of Japan, situated on the Kamogawa River, 230 m. s.w. of Tokyo. The streets are laid out with mathematical regularity, but the houses and shops are somber and plain. The public buildings are distinguished for their architectural beauty. Points of interest throughout the city include the magnificent temples and shrines, beautiful gardens, the old imperial palace, the residence of the shogun and the scenes where are witnessed the spectacular Buddhist ceremonies. Manufactures are important and extensive; fine porcelain, embroidery, enamel, fans, toys and metalware, and silk fabrics woven and dyed for foreign markets, are the chief products. An imperial university is located here, and Kyoto has good schools and is still the artistic, political and intellectual metropolis of the kingdom. Population in 1904, 380,568.

L

LABOR, American Federation of, a federation of trade unions, formally organized under its present name in December, 1886. The organization is the outgrowth of the federation of several labor organizations in opposition to the Knights of Labor. The four principal departments are the building trades, the metal trades, railroad employees and the union-label trades. The membership is over 4,000,000. The organization is influential in settling labor disputes and in securing legislation favorable to labor. See LABOR ORGANIZATIONS.

Lab'oratory, a room or building where scientific investigations are carried on, whether in factory, educational institution or private office. Laboratories undoubtedly originated in the study of medicine and alchemy but are now an essential part of the study of all sciences—botany, zoology, chemistry and physics, and more recently, psychology. The first college laboratory was in connection with the University of Altdorf, Switzerland, and was opened during the 17th century. College laboratories, however, did not become common until the 19th century, when scientific work received incentive from invention.

At present, national, college and private laboratories are common. The first are for the purpose of investigation of foods, soils, plants and animals common to a country or capable of being introduced. They take up all lines of research which may result in benefit to the country. Laboratories in connection with factories investigate improvements in machinery and products, and particularly in the use which can be made of waste materials in production of by-products.

Labor Day, a day set apart as a legal holiday in all the states of the Union and also in Alaska. The first occasion was in 1882 when the Knights of Labor held their general assembly in New York City, which on Sept. 5 reviewed a great parade organized by the Central Labor Union of that city. The year following a parade was held on the first Monday in September, and in 1884 it was decided by resolution of the Knights of Labor that all future parades should be held on that day, the day to be designated as Labor Day. The first Monday in September is now recognized as Labor Day throughout the country. See HOLIDAY.

Labor, Department of, the tenth of the executive departments of the United States Government, created by act of Congress in 1913. By this same act the department of commerce and labor was renamed department of commerce, and from its jurisdiction were transferred to the new department of labor the bureau of immigration and naturalization, the bureau of labor and the children's bureau. The first-named bureau was divided into two bureaus—immigration and naturalization; the bureau of labor was renamed bureau of labor statistics. The purpose of the department is "to foster, promote, and develop the welfare of the wage earners of the United States, to improve their working conditions, and to advance their opportunities for profitable employment." The head of the department, the secretary of labor, is a member of the president's cabinet. See COMMERCE, DEPARTMENT OF.

Labor Organizations, combinations among laboring men who organize for the purpose of improving their positions and securing intellectual as well as financial benefit.

TYPES. They are of three types: the labor union, a general organization of wage earners; the trade union, composed of laborers belonging to a certain trade, or to closely related trades; the indus-

trial union, represented by men working in a definite industry. In the United States there are unions representing the interests of almost all the important industries. Attempts at universal organization have resulted in the formation of international societies such as the International Association, the Knights of Labor and the American Federation of Labor. With the American Federation of Labor are affiliated the majority of trade unions in the United States.

History. Organized labor is more or less a product of modern economic conditions, and it became a prominent factor in industrial conduct and control at the beginning of the 19th century. The craft guilds of the Middle Ages were unions of men organized for the protection of a given craft, but in no other respect did they resemble the modern trades unions. At the time of the Industrial Revolution in England, when industry became capitalized and the laborer no longer owned the materials and tools with which he worked, laborers first made definite attempts at combination. In 1800 the English Parliament declared these unions illegal. This decree was repealed, however, in 1824, and under this partial toleration of unions, which continued until 1906, combination developed rapidly. With the act of 1906, which forbade court action for damages against trade unions, the legality of trade unions was secured.

In the United States there were very few labor organizations in 1825. Twenty years later the first industrial congress met in New York City. In 1850 the Typographical Union was organized. Between the years 1869 and 1885 the Knights of Labor exerted wide political influence, and this was, a few years later, superseded by the American Federation of Labor. In 1902 the membership of the latter organization numbered 500,000; by 1919 it exceeded 4,000,000. It has attempted to secure laws favorable to the laboring class, to encourage the use of union-label goods, to give ready assistance to unions in the case of strikes and to encourage trade unions throughout the country. Originally the organization kept out of politics, but later it attempted to carry out its work by means of the election of candidates who favored the interests of the laboring class. These candidates are chosen, sometimes through the old parties, sometimes independently.

Methods and Policies. The aim of each organization being the protection of the interests of its members, various definite policies are outlined, by means of which this can be effectively brought about. The output of each laborer is limited by establishing a definite day-length, by extra charges for work done overtime and by placing restrictions on the wages of those working by the piece system. When disputes with employers arise, the union engages in them collectively and renders support to the members immediately concerned. This support is called "dispute" benefit. Further, when any members are offered terms of employment which reduce the standard rate of wages, the union offers them an "unemployed" benefit, in order that they may refuse the said terms without suffering from want of work. Other than "dispute" or "unemployed" benefit is rarely offered. In some instances the trade union also represents a friendly society in its functions, and offers aid in cases of illness. See Cooperation; Strikes and Lockouts. Consult Ely, *The Labor Movement in America;* Bliss, *The New Encyclopedia of Social Reform;* Commons, *Trade Unionism and Labor Problems;* Mitchell, *Organized Labor.*

Labouchere, *Lab" oo shar',* **Henry DuPré** (1831-1912), an English journalist and member of Parliament, born in London. He studied at Eton and Cambridge and served from 1854 to 1864 as a diplomat in various positions. In 1865 he first entered the English Parliament. Later he was correspondent for the London *Daily News* and sent dispatches to his paper from Paris during the siege of 1871 by means of carrier pigeons. In 1880 he was again elected to Parliament from Northampton, serving continuously

for more than 20 years. He established and edited *Truth,* a society and political journal; assisted in the investigation of the Jameson Raid of 1896; opposed the government in the Boer War; and was an advocate of Irish Rome Rule.

Lab"rador', a name formerly given to the great peninsula of northeastern Canada lying between the Gulf of St. Lawrence on the south and Hudson Bay on the north. Recently this tract has been divided politically between Quebec and Newfoundland, and the part now known as Labrador is a narrow coastal strip often spoken of as Labrador Coast. It has an area of 120,000 sq. m. and stretches from Hudson Strait at the north to the Strait of Belle Isle, which separates it from Newfoundland. The coast is rough and rocky, indented by numerous bays and fringed with barren islands. In many places the cliffs rise abruptly to a height of from 1000 to 6000 ft. Inland, these descend by forested slopes to the vast tundra of northern Quebec. The climate is cold and forbidding, though in coldest weather it is said to be healthful. The mineral wealth is of importance; iron and labradorite are the most plentiful. The fisheries rival those of Newfoundland and are chiefly salmon, cod and trout. The inhabitants are principally Indians and Eskimos and number about 5000. Consult: Grenfell, *Down North on the Labrador;* Hutton, *Among the Eskimos of Labrador;* Prichard, *Through Trackless Labrador.*

Lab"rador'ite, a variety of feldspar so named because found in Labrador. It is also called Labrador hornblende. It occurs in beautiful blue and green tints, which sometimes are intermingled with reddish tints. It is often used for inlaid work.

Labrador Tea, a dense, erect little shrub of the Heath Family common on mountainsides or hills of northern United States. It has leathery leaves, which are dark green above, but underneath are covered with a rusty-red wool. The margins of the leaves are rolled under, and as the leaves at the ends of the branches have a tendency to stand almost parallel to the stem, the combination of color is very noticeable. In form they are narrow, with pointed bases and apexes and almost no stems. The flowers, which grow in white clusters at the ends of the branches, are surrounded by a close whorl of leaves. Each blossom has four or five tiny green sepals, and five white, spreading petals. There are from five to ten stamens. The younger twigs of Labrador tea are reddish in color and downy, and the shrub is a pleasing one on the hills of the North.

Labur'num, a low tree of the Pulse, or Pea, Family, native in the Alps or western Asia, and planted in the United States for ornament. The tree never grows more than 20 ft. high, has smooth, green bark and slender, hanging branches. The leaves are in three leaflets, and have long, slim stems, giving the tree a delicate appearance. The individual blossoms grow from a main stalk, and they droop as if too heavy for the slender stems. They are golden-yellow in color and open in the late spring. The fruit, like that of all members of this family, is a pod, which, in this particular genus, is thickened at one edge and often spotted with reddish marks. The seeds are said to be poisonous. Laburnum is often called golden-chain and bean-trefoil tree. Scotch laburnum is a less graceful tree with paler flowers.

Lab'yrinth, the names of several famous structures of antiquity, containing many intricate passages and windings. Once it was entered, exit from it was next to impossible to effect. The labyrinth celebrated in Greek mythology was built on Crete, by Dædalus, for the monster Minotaur, to whose ferocity all who entered fell prey. Theseus alone, guided by a string, escaped from the labyrinth. The historical labyrinth of ancient Egypt was located near Lake Mœris, in the district now called Medinet-el-Fayum. This structure contained 3000 chambers, half above ground and half below, and the subterranean apartments contained the interred bodies of

the sacred crocodiles and of the 12 kings who built the labyrinth.

Lac, *Lak,* a resinous substance produced on the bark of twigs of the banyan tree by an insect. This insect punctures the bark and feeds on the sap, and causes a resinous fluid to flow out, which incrusts the twigs and forms stick lac; when broken away from the twigs it is known as seed lac; and when melted and run into thin plates it becomes the shellac of commerce. Lac is the material from which various varnishes are made, and also the lacquers used by the Japanese and Chinese in varnishing their tea basins and other articles. Different colors are produced by adding the necessary dyes to the varnish. See LACQUER WARE.

Lace, an ornamental fabric made with silk, cotton or linen thread. Laces are of two kinds, those made with the needle, usually called point, and those made with a bobbin, sometimes called cushion or pillow laces. All manufactured laces are in imitation of one or the other of these two varieties. Lace making proper originated in the 15th century and appears to have been invented almost simultaneously in Venice and Belgium. The Italian lace was made with the needle, while that of the Flemings was made with the bobbin. The highest perfection of lace making was reached in the 16th century. Many specimens of this lace are in the possession of art museums and are of priceless value. The finest and most expensive of the modern needle laces is *point d' Alençon.* The cushion laces include *Mechlin,* made in Germany and Holland; *Duchess* and *Brussels,* manufactured in Belgium; *Chantilly* and *Valenciennes,* made in France; *Honiton,* in England; and several varieties still made in Venice. *Portuguese point, Irish point, Maltese point* and *Rose point* are among the other varieties, the last characterized by figures worked in relief.

Lace'bark" Tree, a tall, subtropical tree of the Mezereum Family, related to the leatherwood. The tree has a smooth, straight stem and oval leaves. The flowers are white and showy. The tree takes its name from the fact that the tough fibers of its inner bark if soaked in water may be separated into thin, lacy layers. The fiber is used in making rope and in the United States the plant is grown as a curiosity in conservatories. The ribbon tree, a member of the Mallow Family and a native of New Zealand, is also called lacebark because its inner coat has the same lacy appearance.

Lachine, *La sheen',* a city of Canada in the Province of Quebec, on Lake St. Louis, an expansion of the St. Lawrence River, and on the Canadian Pacific Railway, 9 m. s.w. of Montreal. It is the landing place for steamers to Kingston, Toronto and Hamilton. The leading industries include bridge construction, boat building and the manufacture of drain pipes, wire ropes, sash and doors, radiators and window shades. Population in 1911, 10,699.

Lachrymal, *Lak' ri mal,* **Glands.** See EYE.

Laconia, *La ko' ni a,* **N. H.,** county seat of Belknap Co., 27 m. n.e. of Concord and 100 m. n. of Boston, on the Winnepesaukee River between Lake Winnesquam and Lake Winnepesaukee, and on two branches of the Boston & Maine Railroad. Its beautiful scenery, opportunities for fishing and cool climate make it a popular summer resort. The New Hampshire State Home for Feeble-Minded Children, the Gale Memorial Library and a state fish hatchery are located here. Laconia is a prosperous manufacturing center with lumber mills, car shops, paper-box factories, hosiery mills, knitting-machine works, etc. The town was settled in 1780-82 by English people from the southern part of New Hampshire. It was incorporated in 1852 and chartered as a city in 1893. Population in 1920, U. S. census, 10,897.

Lacquer, *Lak' er,* **Ware,** a term given to certain articles of manufacture which possess a very hard, highly polished surface. After the application of each coat of varnish, the ware is carefully dried, baked and polished, all these operations

being necessary to produce the high, glossy finish of lacquer ware. The distinctive feature of this ware is that articles properly lacquered, especially those from Japan, resist the action of boiling water and can, therefore, be used for cooking, as well as for decorative purposes. See LAC; VARNISH.

Lacrosse, *La kros',* a game originated by the American Indians, but now commonly considered the national game of Canada. It is played out of doors, usually by two teams of 12 each, with a small rubber ball. Each player carries a slender bat, or crosse, of any desired length, one end of which is bent back upon itself and lashed with rawhide, like a tennis racket. With these the ball is driven over the field, which should be approximately 125 yards long. At each end of this are the goal posts, six feet apart and six feet high. While defending its own goal, each side endeavors to drive the ball through that of its opponent. The game is won by the team which scores the most goals within the time specified.

La Crosse, Wis., a city and county seat of La Crosse Co., 198 m. n.w. of Milwaukee and 130 m. s.e. of St. Paul, Minn., on the Mississippi River at the confluence of the La Crosse and Black rivers, and on the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Green Bay & Western, the Chicago, Burlington & Quincy and other railroads. Lines of Mississippi steamers ascend the river to this place. The river is here spanned by a number of bridges. La Crosse is situated on a level plain extending about two miles back from the river to bluffs from which fine views are obtained. There is excellent street-car service. The city is the trade center of a rich agricultural region and a general distributing point for western Wisconsin, southern Minnesota and northern Iowa. The city contains well-paved, wide and shaded streets, and there is a fine system of public parks, which include Myrick, Copeland, Riverside and Burns parks. Pettibone Park is on an island in the Mississippi. There are many handsome residences and picturesque drives about the city. Among the noteworthy buildings are the county courthouse, Federal Building, city hall, Y. M. C. A. and Y. W. C. A. buildings, a convent, banks, opera houses and good municipal buildings. There are numerous handsome church edifices and the city is the seat of a Catholic see. A United States weather station and a government fish station are located here.

The educational institutions include a state normal school, agricultural school, high school, public and parish schools, the Washburn Library, several business colleges and a number of private schools. The city is also a center for university extension work. Among the benevolent and charitable institutions are the La Crosse, the St. Francis and the Lutheran hospitals and a hospital for the chronic insane. La Crosse is an important lumber and grain market, and has grain elevators, flour mills, cooperages, woolen mills, carriage and wagon works, lumber and planing mills, engine and boiler works and manufactories of candies, rubber goods, pearl buttons, corrugated-iron roofing, cigars, brooms, brushes, knit goods, agricultural implements, boots and shoes, automobile accessories, crackers and other diversified products.

Father Hennepin visited the site of La Crosse as early as 1680, but the first permanent settlement was made by Nathan Myrick and others in 1841. The place was incorporated as a village in 1851 and granted a city charter in 1856. A revised charter was given in 1891. Population in 1920, U. S. census, 30,363.

Lacteals, *Lak' te als,* the fine lymphatic tubes of the small intestine. They originate in the small intestine and ultimately unite to form large tubes, which terminate in the thoracic duct. They absorb the fatty particles of chyle in the intestines and reduce it to body fat. During digestion they are filled with a milky-white liquid, and during fasting their contents are a yellowish lymph. See DIGESTION.

Ladd, George Trumbull (1842-), an American educator, born at Paines-

ville, Ohio, and educated at Western Reserve College and Andover Theological Seminary. After holding pastorates at Edinburgh, Ohio, and Milwaukee, Wis., he became professor of philosophy at Bowdoin College in 1879. Two years later he accepted the same chair at Yale, afterward succeeding President Porter as professor of metaphysics and moral philosophy. The founding and development of the Yale psychological laboratory are among his achievements. His textbooks have been adopted in Russia, India, Japan and other countries, and he has lectured extensively in foreign lands.

Lado'ga, the largest lake of Europe. It is situated in the northwestern part of Russia, about 40 m. e. of St. Petersburg. Its circumference is 585 m. and it covers an area of over 7000 sq. m. At intervals it reaches a depth of 800 ft. Its waters are cold and contain an abundance of fish. The lake is of great commercial importance to Russia.

Ladrone, *La drone',* or **Mariana,** *Mah" re ah' nah,* **Islands,** a group of islands of the Pacific lying 1787 m. s.e. of Manila. One island of the group, Guam, belongs to the United States; the others were sold by Spain to Germany in 1899. Physically these islands are of two distinct groups; those of the north are mountainous and have several active and extinct volcanoes, while those of the south are low. All are fertile and bear rich vegetation. Rice, maize, wheat, sugar, cotton, tobacco and coconuts are produced. The Ladrones were discovered by Magellan in 1521, and their name, meaning islands of thieves, is the one which he gave them. The population is about 10,000. See GUAM.

La'dybug", or **La'dybird" Beetle,** a family of small, round-bodied beetles which do great service to man. Members of the family are easily recognized by their inferior size and spotted coats, which are red or yellow dotted with black, or black marked with red or yellow. They are found in abundance on plants infested with plant lice, and often lay their eggs in the midst of such a colony so that the hatching larvæ may be well provided with food. The various species are distinguished by the number of spots or stripes; as, the two-spotted, the fifteen-spotted, the two-stabbed, etc. All are of great importance to fruit and shrub growers because of the avidity with which they devour pestiferous insects. Those who kill the industrious ladybugs are destroying an ally that is of greater assistance than any man-made insecticide.

The ladybug larvæ have long, spiny bodies, generally somewhat spotted with red and yellow. The pupæ retain the cuticle of the larvæ, but wear it like little unbuttoned coats or as cushions upon their backs. The prevalence of the ladybug in those countries in which the scale insect is native has led to the introduction of ladybugs into the infested fruit regions of the United States. In California in particular their presence has accomplished much in the reduction of the San José scale. Species imported from Asia and allied species from the Rocky Mountain region of the United States are found efficacious; those of the latter region are collected in the fall when in a dormant state, and are then easily shipped to the orchards where they are to be released. See SAN JOSÉ SCALE; SCALE INSECT; APHID.

Lady's Slipper, an orchid of the woods and marshes, easily recognized by the resemblance of its flower to a moccasin. The leaves, which are broad, light green and deeply-veined, form a close circle about the flower stems and, in some species, arise directly from the root. The flower appears from late in May until July and has an interesting form: there are three sepals, two of which are long, rather slender and not brightly colored; the third one hangs over the flower or stands up behind it; the petals are pink, white or yellow, often striped with dark lines of purple or brown, and the largest is not unlike a moccasin or a wooden shoe in form. Among the most common species are the showy Lady's slipper, the yellow Lady's slipper and the moccasin flower, or stemless

Lady's slipper. The Lady's slipper is the state flower of Minnesota.

La Farge, John (1835-1910), an American artist, born in New York, the son of a French army officer, who gave him a liberal education. One of the artist's earliest works was the mural decoration of Trinity Church, Boston, completed in 1877. Soon after this, La Farge began to work in stained glass, in which medium his most lasting contributions to art were to be made. His windows are a decorative feature in numerous churches and private mansions in New York and elsewhere; and since the artist's death their increased value is indicated by the fact that they are now sought by museums. They are chiefly remarkable for beauty of design and purity of color. Noteworthy among them are the circular mosaic windows in the Second Presbyterian Church, Chicago; that of Crane Memorial Library, Quincy, Mass.; and that of Judson Memorial Church, New York City. Those of Trinity Church, Buffalo, and Memorial Hall, Harvard University, are also important. His paintings include *The Arrival of the Magi*, Church of Incarnation, New York City; and mural decorations in the Minnesota State Capitol, St. Paul. He contributed two volumes to art criticism, *Considerations on Painting* and *Great Masters*.

Lafayette, *Lah" fa yet'*, **Marie Jean Paul Roch Yves Gilbert Motier,** MARQUIS DE (1757-1834), a French general and statesman, a trusted officer of the American Revolution, born of an ancient family in the Castle of Chavagnac, in the Department of Haute-Loire. He entered the French army in 1774, and, having evaded the government officials with Baron de Kalb and ten other companions, sailed early in 1777 for America in a vessel which he fitted out at his own expense. He was warmly welcomed on his arrival, and was soon commissioned major-general in the Continental army, besides becoming a member of Washington's staff. Lafayette was wounded at Brandywine and disabled for six weeks; he distinguished himself at Monmouth, commanded with Sullivan and Greene at Newport and led the American vanguard when Cornwallis was entrapped at Yorktown, receiving the public thanks of Washington on the day following the British surrender. In the meanwhile, from January to May, 1779, he had been in France, where he exerted his influence in behalf of the colonies. Having given his service and about $150,000 to the American cause, Lafayette sailed home from Boston in December, 1781. Three years later he paid a five months' visit to the United States and was everywhere enthusiastically received.

Lafayette took his seat in the French Assembly of the Notables, and, in 1789, was elected to the States-General, which he aided in turning into the National Assembly. He was vice-president of this organization for some time, and proposed a bill of rights and a plan for the responsibility of crown officials. On the day following the attack on the Bastille, he became head of the National Guard of Paris, later reorganizing the Guards throughout France and becoming responsible for the adoption of the tricolor. In the early part of the Revolution he seemed to control French destinies, and it was he who, on Oct. 5 and 6, 1789, saved Louis XVI and Marie Antoinette from the mob which had possessed Versailles. But despite his services, Lafayette did not find favor with the Royalists, for whom his views were too democratic, nor with the radicals, for whom he was too conservative. See FRENCH REVOLUTION.

Lafayette helped found the Club of the Feuillants, 1790, was defeated for the mayoralty of Paris, 1791, and the following year, when war against Austria and Prussia broke out, commanded the Army of Ardennes, which he left to return to Paris, where he strove to overturn the Jacobins. But with his influence gone and his life in danger, he was forced to flee to Flanders. The Austrians took him prisoner and he was confined at Olmütz, despite the pleas of several foreign governments, where he

remained until Napoleon provided for his release in 1797. Upon his return to France, in 1799, he took no part in public affairs, being opposed to the Bonaparte regime. Later, however, in 1815, he belonged to the French House of Representatives; from 1818 to 1830 he was a member of the Chamber of Deputies; and for the last five years of his service led the opposition. In 1824-5 Lafayette again visited the United States, where the highest honors were conferred upon him. Congress voted him $200,000 and a township of land, and placed at his disposal a warship, in which he returned to France. Once again commander of the National Guard of Paris, 1830, Lafayette exerted great influence over the populace during the Three Days' Revolution, and to him Louis Philippe was chiefly indebted for his accession. In 1876 New York City erected a monument to Lafayette's memory.

Lafayette, Ind., a city and county seat of Tippecanoe Co., 64 m. n.w. of Indianapolis, on the Wabash River and on the Wabash and Erie Canal, at the junction of the Lake Erie & Western, the Wabash, the Big Four and other railroads. Interurban lines connect the city with near-by towns and cities. It is situated in an agricultural region and is an important market for grain and live stock. Pork packing is one of the chief industries. Lafayette has manufactories of machinery, carpets, flour, carriages and wagons, soap, electrical machinery, reapers and mowers and other farm implements. Purdue University, the Indiana State College of Agriculture and Technology and the St. Ignatius Academy are located here. The city also contains St. Elizabeth and Home hospitals, the Indiana State Soldiers' Home and St. Joseph's Orphan Asylum. Lafayette was settled in 1826 and chartered as a city in 1853. Population in 1920, 22,456.

La Follette, *Lah Fol' et,* **Robert Marion** (1855-), an American lawyer and statesman, born at Primrose, Wis. At the age of 24 years he graduated from the University of Wisconsin at Madison. He studied law and began practice in 1880, and was made district attorney of his county the same year. From 1887 to 1891 he served in Congress, winning considerable distinction as an orator and becoming known for his strong efforts in favor of the McKinley tariff law. He was governor of Wisconsin from 1900 to 1905, when he resigned to take a seat in the United States Senate. Throughout his public career he has taken an active and often a leading part in the introduction of financial and political reforms. In the split in the Republican Party which occurred during the Taft administration La Follette was one of the leaders of the progressive wing, and was one of the candidates for the nomination to the presidency.

La Fontaine, *La Fong" ten',* **Jean de** (1621-1695), a French poet, born in Champagne. He began to study for the priesthood, but theology did not appeal to him, and after the age of 30 he entered upon a literary career. In 1654 he translated the *Eunuchus* of Terence, and received a pension of 1000 livres a few years later. He formed a close friendship with Molière, Racine and Boileau, and together the four exerted wide influence on contemporary French literature. At 60 he was among the first men of letters in France. In society La Fontaine was awkward, absent-minded and silent even to the point of rudeness; in art his fame is world-wide because of his fables with their subtle reflections on life, their freshness and vividness, and because of his perfect mastery of handling a story. His verse is fanciful, often amusing, but never transports or suggests deep passion. Several volumes of *Fables* and *Contes* (*Tales*) appeared during his lifetime.

Lagerlöf, *Lah' ger luf,* **Selma** (1858-), a Swedish novelist, born in Mårbackågord, in Wermland. She taught school in Landskrona from 1885 to 1895, after studying in a normal school in Stockholm. Her first novel, *The Story of Gösta Berling,* appeared in 1891. Other works of equal merit followed, and as a result of a

request made by the National Teachers' Association that she write a supplementary reader which should embody the natural history and geography of the country, she produced *The Wonderful Adventures of Nils* and *The Further Adventures of Nils,* a delicate narrative where her imagination played freely around the fairy lore of her native country. A year after its appearance she was awarded the Nobel prize in literature (1909). Her work represents a break with the modern morbidly realistic literature, and in a wholesome optimistic spirit reveals what is big and noblest and best in men. Of a modest and retiring nature, she loves her childhood home among the blue hills of Wermland, where she seeks retirement and lives with her aged mother; on the other hand, she is a social force of great power, exerting wide influence on the woman suffrage movement in Sweden. Among her other works are *Invisible Links, Miracles of Antikrist, Jerusalem, From a Swedish Homestead* and *Christ Legends.*

Laissez Faire, *Les' sa" Fair',* a French phrase meaning to let alone. In economics the term is applied to a policy which is opposed to regulation of industry and commerce by government, especially to government restrictions. The policy is based on the economic theory that all lines of industry thrive best when the producer and consumer are left free to make exchanges according to mutual agreement. The doctrine is not anarchistic, and does not deny the State the right to make those regulations which are for the public good, but it is opposed to regulations bordering on paternalism.

Lake, a term used by dyers to signify the coloring matter prepared by the addition of metallic salts to an organic dye. The reaction is supposed to take place in the fiber of the cloth, and the salt solution used is called a mordant. The word *lake* is sometimes used specifically to mean a red pigment prepared from cochineal, or the color produced by that pigment. The mordants employed are generally salts of aluminum or tin.

Lake, a body of water surrounded by land. Lakes may be either fresh or salt. Of the salt-water lakes two kinds are recognized: first, those which are portions of the sea, cut off from the general oceanic area by surface or subterranean agencies; and, second, those which were originally fresh, but which have become saline by evaporation. The former range in size from mere pools to large inland seas, such as the Caspian, Black and Aral seas; the latter include such bodies as the Dead Sea and the Great Salt Lake of Utah.

Fresh-water lakes are of several kinds: *crater lakes,* which occupy craters of extinct volcanoes; *sink lakes,* those lying in depressions caused by sinking of the earth overlying soluble and disappearing rocks; *glacial lakes,* resulting from glacial erosion; *obstruction lakes,* including deserted loops in river channels, or lake-like expansions in rivers; *earth movement lakes,* those occupying hollows caused by warping of the earth's crust or similar movement; *subterranean lakes,* found in underground channels and which have been excavated by water seepage. The largest fresh-water lake in the world is Lake Superior, which covers an area of 31,200 sq. m.; the most elevated is Lake Titicaca between Peru and Bolivia, which is 12,500 ft. above the sea level.

Lake Charles, La., a city and the parish seat of Calcasieu Parish, 218 m. n.w. of New Orleans, on the Calcasieu River and on the Kansas City Southern, the St. Louis, Watkins & Gulf, the Louisiana Western and other railroads. The city is of importance commercially and has several plants connected with the lumber and rice industries. It is finely situated on Lake Charles and is one of the most attractive cities in the state. Arcadia College, a high school and a Carnegie library are among its educational institutions. The other notable features include a fine Federal Building, a handsome courthouse, a winter hotel and a park. Settled about 1849, Lake Charles was first incorporated in 1860. Population in 1920, U. S. census, 13,088.

Lake Dwellings, primitive houses built on artificial islands or piles along the margins of lakes. Large piles were driven into the bottom of the lake or creek, and these supported the platform on which the dwellings were built. Another method was to build a solid understructure of brushwood. The huts were arranged in the form of a cluster or village for the accommodation of several families or groups. Lake dwellings are still prevalent in South America, central Africa, Borneo and New Guinea. The early lake dwellers of southern Europe belonged to the Stone and Bronze ages, but relics of their work indicate that they were not in a low stage of civilization.

Lake Le'man. See GENEVA, LAKE OF.

Lake of the Woods, a lake situated partly in Minnesota and partly in Manitoba, Canada. It is about 70 m. long and from 10 to 50 m. wide. Its outline is very irregular, and its shores are wooded, making it an attractive body of water. It is connected by the Rainy River with Rainy Lake, and drains through the Winnipeg River into Lake Winnipeg.

Lake School, or **Lake Poets,** the name given by the *Edinburgh Review* to Wordsworth, Coleridge and Southey, who were among the poets of the Romantic movement of the early part of the 19th century. The name was suggested by the residence of these men in the picturesque lake region of Cumberland and Westmoreland.

Lamaism, *Lah' ma iz'm,* a variety of Buddhism, the priests of which are called Lamas. This religion dates from the seventh century and prevails chiefly in Siberia, Manchuria, Tibet and Mongolia. Buddha is regarded as the founder of the religion and the first in rank among the saints. The two heads among the priests are the Dalai-Lama and the Teush-Lama, in whom Buddha is supposed to be incarnate. The Dalai-Lama is the more powerful of the two priests and he is the acknowledged head of the Buddhists of Tibet, Mongolia and China. He resides at Potala, a hill near Lhasa.

Lamar', Lucius Quintus Cincinnatus (1825-1893), an American jurist and statesman, born in Putnam County, Ga. He graduated at Emory College in 1845 and was admitted to the bar in 1847. After teaching a year in Mississippi, he returned and served in the Georgia Legislature in 1853. Going back to Mississippi, he represented that state in Congress from 1857 to 1860, when he resigned to join the Confederate army. He spent two years in Europe during the war as unofficial representative of the Confederacy. At the close of the war he accepted a chair in the University of Mississippi, but returned to the House of Representatives in 1873, entering the Senate in 1877. In 1885 he became secretary of the interior in Cleveland's cabinet, and in 1888 was appointed associate justice of the United States Supreme Court.

La"mar"tine', Alphonse Marie Louis de (1790-1869), a French statesman, historian and poet, born at Milly, near Mâcon. He studied at Lyons and Belley, traveled in Italy and Switzerland, and was in the army for a short time, as well as in the diplomatic service as secretary to the embassy at Naples. His early writings were popular, and when in 1848 he became a member of the provisional government of France and minister for foreign affairs he rose to the position of one of the most prominent men of Europe. His eloquence surpassed his ability as a statesman, and after governing for some time with uncertain hand he fell into disfavor. As a past servant of his country he again resumed his literary labors. He wrote extensive histories, distinguished for rhetorical display rather than accuracy. His poetry, though it falls short of the brilliance of the Romanticists, is also lacking in their extravagances. Among his works are *Meditations, Poetic and Religious; Harmonies, Poetic and Religious; History of the Girondins;* and *History of the Revolution of 1848.*

Lamb, Charles (1775-1834), an English essayist and critic, born in London. After studying at Christ's Hospital

School he became a clerk in the South Sea House. In 1792 a friend obtained for him an appointment in the accountant's office in the East India House, a position which he held for 33 years. He was wont to say playfully that the 100 or more official folios of that office represented his true "works." A strain of insanity ran in the family, and in 1796 his sister Mary, seized by a sudden mania, killed their mother. This calamity long colored their lives, and Charles Lamb gave up all thought of marrying Ann Simmons, "the gentle maid," and spent his life caring for his sister, who outlived him several years, and assisted him at times with his literary work. Although his earliest poems appeared in 1796, he produced nothing of lasting merit until he was 45 years of age. In 1820 his famous random essays appeared in the *London Magazine* and the collected papers were called the *Essays of Elia.*

There is in Lamb's work something profoundly pathetic, something equally merry. He excelled in reminiscence and portraiture, a whimsical, genial atmosphere pervading all his work. Among favorites of single essays are *Dream Children, Old China, Recollections of the South Sea House* and *Poor Relations.* His style was artlessly simple, the result of a careful study of the prose writers of a century and a half earlier than his own. Of his poems few are remembered except the tender and quaint *Old Familiar Faces, Hester, On an Infant Dying as Soon as Born* and *Farewell to Tobacco.* Neither his novel, *Rosamund Gray* nor his plays, *John Woodvil* and *Mr. H.,* were a success. With his sister Mary were written the *Tales from Shakespeare,* he writing the tragedies, Mary the comedies. In criticism he was keen and discriminating, but appreciative, first and last. For exquisite humor and permanent appeal, however, none of his other works has the charm of the favorite *Essays of Elia.*

Lam'bert's Pine, or **Sugar Pine,** a tree of great size and beauty and a member of the Pine Family. In its native haunts it often reaches a height of 200 to 250 ft. with a trunk sometimes 12 ft. in diameter; its slender, waving branches then spread to 60 or 70 ft. and sweep in long, graceful curves. The bark on the younger stems is thin and dark green, on older ones, dark or purple-brown and scaly. The wood is used for interior construction, woodwork and shingles. The leaves, which are long, slender and needlelike, occur five in a group. The cones are solid and long, often attaining a length of 21 inches. A resin exuded by the heartwood of this pine has a sugary flavor; hence the name sugar pine. The tree grows on Western mountain slopes and is sometimes planted as an ornamental tree.

Lam"enta'tions, a book of the Old Testament, following *Jeremiah* and preceding *Ezekiel. Lamentations* is a pathetic ode, written by the prophet Jeremiah as an expression of his grief for the destruction of Jerusalem and its Temple. There are five chapters, each of which may be regarded as a distinct elegiac poem. . The date of the composition is immediately following the destruction of Jerusalem. See BIBLE, subhead *The Old Testament.*

Lammergeier, *Lam' er gi" er,* a vulturelike bird of prey living in southern Europe and western Asia. It is about 40 inches long and the wings have a spread of nearly ten feet. The back is dark brown, the under parts somewhat tawny, and the head white, with black side lines. There is a tuft of black bristlelike hairs under the chin. The large nest is placed on a rocky ledge and contains one brownish-orange egg. This bird is called by the Germans "lamb vulture," and feeds upon small animals, as well as carrion. Tortoises form a large part of its food, and it breaks their hard shells on rocks by dropping them from a considerable height. The lammergeier has the appearance of an eagle, and it is credited with great strength and boldness.

Lamont', Daniel Scott (1851-1905), an American lawyer and statesman, born in Cortlandville, N. Y., and educated

at Union College. In 1883 he became private secretary to Grover Cleveland, retaining this position until 1889, and in President Cleveland's second administration he was secretary of war. In 1897 Lamont was elected vice-president of the Northern Pacific Railway.

Lamp, a contrivance for making light. The lamp originally was a cuplike receptacle with a handle on one side and a projection on the other to hold a wick. This form of lamp is printed in books and on diplomas, and is the traditional "lamp of learning." At first the cups of lamps were made from seashells and the skulls of animals, with reeds and rushes for wicks, and the fat of animals was used for oil. From this simple form the lamp has been developed until it has become a somewhat complex structure, which in the most expensive patterns is highly ornamental. With the introduction of kerosene, flat cotton wicks were employed with suitable burners and glass receptacles. Then came the so-called student lamp with a special round wick and burner, invented by Argand, which produced a better light. After the introduction of illuminating gas, the invention by Bunsen of the burner which bears his name converted an illuminating flame into a heating one of great intensity. This flame, impinging on a surrounding mantle, the invention of Carl Auer von Welsbach, produced an incandescent gas light of great brilliancy. Other steps in advance were the inventions of Edison and others in electric arc and electric incandescent lamps. See ELECTRIC LIGHTING.

Lamp'black", the soot or carbon originally obtained by holding over a lamp flame, polished surfaces to collect the deposit arising from incomplete combustion. It is now produced commercially from petroleum, tar, resin and other substances containing a large proportion of carbon, by burning them without a full supply of oxygen and collecting the soot in chambers. Lampblack is employed principally in the manufacture of printing inks, shoeblacking and in paints. See CARBON; COMBUSTION.

Lampman, Archibald (1861-1899), a Canadian poet, born at Morpeth, Ontario. He graduated at Trinity College, Toronto, in 1882, taught school and later went to Ottawa in the employ of the government post office. He began to write poems while in college, but did not publish any of his writings until 1888. His works embrace *Among the Millet, and Other Poems* and *Lyrics of Earth.*

Lam'prey, an eel-like fish of the Petromyzontid Family found in Europe and America. It has a round sucker mouth by which it attaches itself to other fish, where it can eat away their flesh with its spikelike teeth. The small lamprey is found in the lakes and streams of central United States; all are considered pleasing food.

Lan'caster, Ohio, a city and county seat of Fairfield Co., 32 m. s.e. of Columbus, on the Hocking River and the Hocking Canal and on the Toledo, the Cincinnati & Muskingum Valley and other railroads. The excellent shipping facilities have made Lancaster an important trade center. Railroad shops and carbon works are located here and there are large manufactories of agricultural implements, flour, shoes, flint and window glass and foundry products. The city is the seat of the Ohio State Industrial School for boys and the Columbia Commercial School. The first settlement was made in 1800 and the town was incorporated in 1831. Population in 1920, 14,706.

Lancaster, Pa., a city and county seat of Lancaster Co., 68 m. w. of Philadelphia and 37 m. e. of Harrisburg, on the Conestoga River and on the Pennsylvania, the Philadelphia & Reading, the Lancaster, Oxford & Southern and other railroads. There is excellent electric transportation to Millersville, Manheim, Coatesville, Philadelphia and many nearby towns and cities. The city is attractively situated in a fertile agricultural region 418 ft. above sea level, and has varied and important manufacturing industries. Lancaster has broad residence streets, well shaded by beautiful

trees. The city contains a fine park system, aggregating 239 acres, Long's of 73 acres and Williamson's of 64 acres being among the largest parks. There is a soldiers' monument. Among the public buildings are a courthouse, public market houses, post office, Y. M. C. A. and Y. W. C. A. buildings, banks, theaters and substantial business blocks.

The city is the seat of Franklin and Marshall College, which has earned a high standing among the educational institutions of the state, and the Theological Seminary of the German Reformed Church. Lancaster also contains several preparatory schools, A. Herr Smith and Watts De Peyser public libraries, Mechanics and Lancaster Historical libraries and the Lancaster Seminary. Other institutions include the Thaddeus Stevens Industrial School for orphans, Ann C. Witmer and Henry G. Long homes for aged women, Stevens' Home for friendless children, St. Joseph's and Lancaster General hospitals and a Mission Home.

Lancaster is an important tobacco and grain market. Cattle raising and farming are important industries of Lancaster County. The city contains numerous cigar factories, boiler and engine works, blower and forge works, silk and cotton mills and manufactories of linoleum, emery wheels, umbrellas, watches and watch materials, wagons and carriages, electric apparatus, architectural iron, mattresses, automobiles, silver plating, perfumery and cosmetics, cocoa products, cork, druggists' preparations, confectionery, leather and elevators.

The first settlement was made in 1717 by English Quakers and Germans. An important treaty was negotiated here in 1744 with the Iroquois Indians by the governor of Pennsylvania and commissioners from Maryland and Virginia. The Continental Congress sat here on Sept. 27, 1777, after being driven by the British from Philadelphia. From 1799 to 1812 Lancaster was the capital of the state. The place was laid out as a town in 1730, incorporated as a borough in 1742 and chartered as a city in 1818. Population in 1920, 53,150.

Lancaster, House of, a line of English kings descended from John of Gaunt, the fourth son of Edward III. Henry IV, who followed the deposed Richard II (1399), was the first of the kings, and his son, Henry V, continued his strong rule; the line closed with Henry VI.

Lance, a weapon consisting of a handle from 8 to 11 ft. long, with a sharp steel point and metal heel, and used both by horsemen and foot soldiers. The lance was in use before the invention of gunpowder and is still used, being abolished in Great Britain as late as 1903. It was a very common weapon among the Greeks and the Romans.

Land and Sea Breezes, air currents which occur regularly day and night on the coasts of large bodies of water. During the day the land becomes heated more quickly than the surface water, and the lower layer of atmosphere, becoming correspondingly heated, expands and becomes lighter and is pushed upward by the cooler air of the sea. This results in a brisk breeze from the water. After sunset the land begins to cool, causing a land breeze blowing towards the sea. See MONSOON.

Land Crab, a tribe of interesting Crustaceans which are found in the warmer parts of both hemispheres. Though land animals, they need considerable moisture, and to retain this the carapace, or shell-like covering, is lined with a spongy membrane, which forms a reservoir where water is stored to be absorbed as needed. The land crabs live in holes in the ground, in rocks or in hollow trees, from which they sometimes come forth in such large numbers that the ground itself seems in motion. If not attacked, a land crab will follow a person and make menacing gestures with its claws; if pursued, it retreats rapidly but always facing its foe. When seized, it readily drops a claw and will retire to its burrow until a new one is generated. In May, the rainy season, a general migration to the sea takes place, and the land crabs are said to go in a straight line over cliffs, buildings and

ridges; if a member of the company is disabled, the rest halt long enough to devour him; but, unless the rain ceases, nothing else stops them until they reach the sea, where their eggs are deposited. Natives of the West Indies and Brazil fatten these crabs in their potato fields and eat them, but in other localities they are not especially prized as a food. See CRAB.

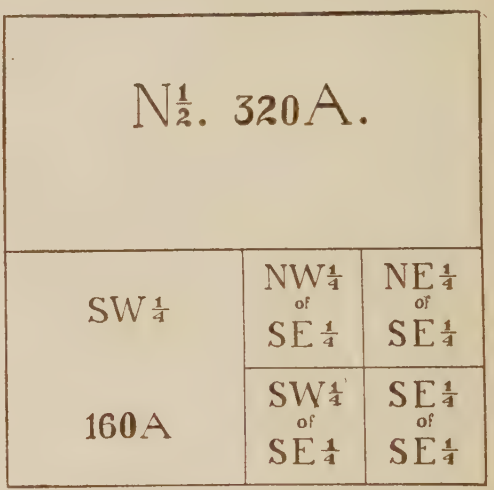
Lan'dor, Walter Savage (1775-1864), an English writer, born in Warwickshire. He studied at Oxford but entered no profession, and in 1798 appeared one of his most famous poems, *Gebir*. In 1808 he served in the Spanish national army against Napoleon, and, returning after the disasters of Cintra, resumed his literary labors. After traveling on the Continent he retired to Florence in 1821; he revisited England once, but returned to Italy in 1858, remaining there until his death, with Browning as his most untiring and devoted friend. Though fitful in spirit, he wrote almost incessantly from the age of 19 up to his 90th year. Some of his lyrics, trifles merely, are tenderly exquisite; the classical sweep of his blank verse is exalted in its loveliness. And in his prose, both Latin and English, there is a dignified restraint far different from his stormy temperament, while his sentences are without blemish, pure and finished. His writings include *Gebir, Lyrical Ballads, Hellenics, Count Julian, Imaginary Conversations, Pericles and Aspasia* and *The Pentameron*.

Land Rail. See CORN CRAKE.

Landscape Gardening. See GARDENING.

Land'seer, Sir Edwin Henry (1802-1873), an English painter. The son of an engraver of high repute, he was taught to draw at an early age. Two of his sketches were exhibited at the Academy when he was 13 years old. After this he studied at the Royal Academy Schools and acquired great skill through minute study from life. He was elected a member of the Royal Academy in 1831, and in 1865 declined the presidency of that body. Landseer was preeminently the painter of dogs, and the technical proficiency, strength and affection which he displayed in the handling of this subject brought him fame. Among his best-known canvases are *The Old Shepherd's Chief Mourner, Odin, Eos, Monarch of the Glen* and *The Sanctuary*.

Lands, Public, that part of the public domain under the control of the National Government. The public lands of the United States have been acquired in three ways: by cessions from the individual states, by treaties with foreign nations, and by accessions from Indian tribes through conquest or by purchase. The charters granted the settlers of Virginia and Massachusetts limited their



A SECTION SHOWING DIVISIONS

territory by north and south boundaries alone, and their respective claims extended "westward indefinitely." Their charters gave Virginia, the New England Colonies and New York extensive areas of unsettled territory. When the Articles of Confederation were presented for adoption, the states which had no such domain protested on the ground that when these regions were settled it would give the states controlling them undue influence, and Maryland refused to adopt the Articles until the states had released their respective claims to this territory. As a result these lands were given to the United States, with the exception of a portion of Ohio, which was

held in reserve by Connecticut and afterwards known as the Western Reserve (See WESTERN RESERVE).

By the Treaty of Paris, 1783, the western boundary of the United States was fixed at the Mississippi River, and in 1787 the region north of the Ohio was organized into the Northwest Territory (See ORDINANCE OF 1787). The next great addition to the public domain was through the purchase of Louisiana in 1803. See LOUISIANA PURCHASE; also UNITED STATES, subhead *Acquisition of Territory*.

The government has disposed of public lands in various ways. The Ordinance of 1787 established the precedent of making liberal reserves for educational purposes. These included grants for universities and public schools, and the lands set apart were given to their respective states. In 1862 special grants were made the states for establishing agricultural colleges. Grants were also made to individuals for public services, as those to soldiers of the Revolutionary War and the War of 1812, and later to corporations as part compensation for the construction of roads, canals and railways. The first idea of Congress was to derive revenue by sale of the public lands, and previous to 1801 large tracts were sold to corporations. Previous to this, in 1796, Congress had provided for the sale to settlers of lots not less than one mile square, but the law was amended to include smaller lots, and by 1820 land was sold in lots as small as 80 acres.

The public lands are in charge of the general land office at Washington, D. C., at the head of which is a commissioner, and there are over 100 local offices distributed over 25 states and Alaska. The lands are classified as follows: (1) Agricultural lands. These are rated either as "double minimum," within a specified distance of works of internal improvements, and sold at $2.50 an acre; or minimum, at $1.25 an acre. (2) Town sites; either sold at public auction for $10 an acre, or inhabitants of cities or towns are granted the privilege of entry at $1.25. (3) Mineral lands, varying from placer locations at $2.50 an acre to mining rights at $5; not to exceed 1500x600 ft., nor to go below 1500x50, thus varying from 20.66 to 1.72 acres. (4) Timber and stone, unfit for cultivation, 160 acres limit, $2.50 an acre. (5) Saline, containing salt springs; offered first at public auction for $1.25 an acre, then held for private sale at the same price. (6) Coal, limit of 160 acres to a person and 320 to a company, save that the latter (if at least four persons) on expending $5000 can enter 640 acres more; $10 an acre if over 15 m. from a railroad, $20 if less. (7) Desert, limit 640 acres, price 25 cents an entry, with an affidavit of intending to irrigate it within three years; which done, $1 an acre more secures a full title.

Private entry can be made upon lands through the Homestead Law (See HOMESTEAD), by purchase at public auction and under the Irrigation Act of 1902. These entries are subject to the limitations stated in connection with classification. The public lands are surveyed on a rectangular system, planned by Thomas Jefferson for the Northwest Territory. It provides for the division into ranges, townships, sections and quarter sections. The ranges are bounded by meridian lines six miles apart and the townships by base lines six miles apart. The townships are numbered north and south from a base line and the ranges east and west from a principal meridian. Aside from the present reservations for national parks, forestry preserves and other purposes, there were in 1917, 230,657,755 acres of unoccupied lands in the United States. See CONSERVATION; FORESTRY; IRRIGATION.

CANADA. The public land laws of Canada are similar to those of the United States. The lands are surveyed on the rectangular system and are subdivided into ranges and townships. Each township is square and contains 36 sections of 640 acres each. These are divided into quarter sections of 160 acres each. Two sections in each township in the newer provinces of the Northwest are

reserved for school purposes. The Hudson's Bay Company also has two sections. Aside from these four sections, all public lands in each township are open for entry for homesteads or for purchase outright.

When land is purchased outright, one-tenth must be paid at the time of purchase and the remaining nine-tenths in equal, annual installments with interest at six per cent, payable with each installment. The purchaser must also agree to abide by the requirements of the law. Should he abandon his claim before completing the payments or fail to meet the payments when they become due, he forfeits all he has paid and may forfeit all improvements at the discretion of the agent.

Homesteads of 160 acres may be procured by *Homestead Entry*. They are opened only to heads of families and male citizens who have attained the age of 18 years and are British subjects or have declared their intentions to become British subjects. An entry fee of $10 is required, and the applicant must apply in person, except in special cases provided for in the law. The homesteader must within six months of the date of entry appear before the agent and satisfy him that he has already moved upon the land or is on his way. Before applying for a patent the homesteader must have erected a house upon the land worth at least $300, and he must reside upon his land for at least six months in each of three years and perform the homestead duties required under the law. The entry does not include mineral or water rights.

Lang, Andrew (1844-1912), a British poet, story-writer and essayist, born in Scotland. He was educated at the Edinburgh High School, a college connected with the University of St. Andrews, and at Balliol College, Oxford. He devoted himself at college to the study of classical and British literature, and in 1872 published his first volume, *Ballads and Lyrics of Old France*, the beginning of a long and varied literary career. His ability as a keen and discriminating critic and his wide range of reading are revealed in his *Letters to Dead Authors*, and his scholarship and versatility, in his translations of Homer, Theocritus, Balzac, Tolstoy and others. He was greatly interested in folk lore, a field of knowledge to which he made important contributions, and an ardent lover of ghosts and fairy tales. Among his most charming volumes are his series of fairy stories. Other fields in which he gained renown are history, biography, journalism and anthropology.

Langelier, *Lahnzh" lya',* **Sir François Charles Stanislas** (1838-), a Canadian statesman, born in the Province of Quebec and educated at Laval University and in Paris, France. A leader of the provincial bar, he practiced in Quebec, where for many years after 1866 he was on the law faculty of Laval University and later dean of the faculty. From 1882 to 1890 he was mayor of Quebec; meanwhile and till 1898 he sat in the House of Commons, and from 1878 to 1889 he was successively commissioner of crownlands and treasurer in the local administration. In June, 1906, he became a puisne judge of the Superior Court to perform the duties of chief justice for the Quebec District, and in 1911 he was appointed lieutenant-governor of the Province of Quebec. King Edward knighted him in 1907.

Lang'land, William (about 1332-about 1400), an English poet, born at Cleobury Mortimer, South Shropshire. Until recently he has been considered as the sole author of the remarkable English poem, *Piers the Plowman*. Of Langland himself, nothing is known except what is gained from the internal evidence of the poem, and scholars like Skeat and Jusserand have pieced together the various autobiographical hints in the work and have thus compiled an account of the poet's life. Prof. J. M. Manly, of the University of Chicago, on the other hand, finds evidences, because of differences in style and thought, that the poem is the work of five different men. This view, now gaining acceptance among scholars, makes Langland merely

the "mythical author." The poem is in part allegorical. There is vigorous satire on widespread abuses in the Church and State, and a vivid description of the life and manners of the lowly. The meter is alliterative, and the production is a linguistic monument of great value.

Lang'ley, Samuel Pierpont (1834-1906), an American scientist and astronomer, born in Roxbury, Mass., and educated in the Boston Latin School and in Europe. He was assistant at Harvard Observatory, professor of mathematics in the United States Naval Academy and director of the Allegheny Observatory, where in 1869 he inaugurated the railroad time-service system from observatories. In 1887 he became secretary of the Smithsonian Institution. He made observations on the sun's heat, extended the invisible portion of the solar spectrum and invented the bolometer. Congress appropriated him $5000 for experiments in aerial navigation. See AERONAUTICS.

Lang'ton, Stephen (about 1150-1228), an English cardinal and statesman. He was educated in the University of Paris, of which he later became chancellor. During a visit to Rome he was created a cardinal (1206) by Leo III, who later nominated him to the See of Canterbury and consecrated him archbishop. Langton was the first signer of the Magna Charta, and when the barons who had signed with him were excommunicated, he refused to publish the edict and was suspended. Later, he crowned Henry III, by whom he was reinstated in his see. He was the author of many theological and reformatory treatises, and he has been accredited with having divided the Bible into chapters.

Language, *Lang' gwaje,* the means of communicating feeling or thought. In a more restricted sense the term is applied to such forms of expression as common usage and social convention have made universal. Primitive man at first had gesture, grimace and utterance as means of expression. The first of these played so important a part that the earliest human language was practically one of gesture signs. Even now, in advanced stages of culture, the three are more or less combined, although the voice has won to itself a position of primary importance because of the advantages connected with its use. It represents greater physical economy, allows for wider variation of expression and has superior perceptibleness. Though it has developed as the fitting organ for speech, it must not be inferred that there is any relation between thought and utterance. It is merely a "survival of the fittest," and the muscles used in producing audible sounds have no more direct connection with the thinking process than have those that produce visible or other motions.

STUDY OF LANGUAGE. Language may be studied as an art (See LITERATURE), as a utility, that is, in its relation to composition and elocution, or as a science, philology. Philology deals with the study of the word, or language as such. It includes the threefold divisions: the psychology of language, or the relation of it to mind in general, its natural history and its origin; phonetics, or the physiological bases of speech (See PHONETICS); and philology in a narrower sense (limited to the study of the history and structure of languages).

ORIGIN. The original theory, that language is a direct gift from the Creator, has given way before scientific investigation. Two views are now held as to the reason for the creation of language. The older, accepting language as the result of a need for communication, holds that the audible sounds of external objects were imitated. This has been termed the imitative theory of language, and was attacked by Max Müller, who gave it the name of the Bow-Wow Theory. The other view holds that the earliest utterances were without thought of communication, and that they were simply the result of natural expression, like cries of joy and pain. A popular name for this was the Pooh-Pooh Theory. Max Müller adopted a third, the Ding-Dong Theory, which finds the germ of language in the rhyth-

mic chant adopted when men assembled in large groups for the dance of war. It has now but little vogue.

Development. Language is not an organism, growing by its own inherent powers. To comprehend the history of its development, one must study the changes that have been going on within recent years, or that are now going on, for human nature is sufficiently the same to make human speech alike in its essential features, whatever the period or the stage of civilization. No two persons speak exactly alike. When men are isolated into groups their forms of speech tend to resemble one another; on the other hand, their relation to other groups is one of marked differences caused by individual peculiarities. As a result, different dialects arise, then different languages, for languages are nothing more than dialects in which the variations are strongly marked. As civilization advances, the tendency to unification is stronger than that of differentiation, especially in literary forms of speech. Borrowing from one language into another, as well as mixing through social intercourse, causes resemblances and general similarities in languages.

History of Science of Language. A systematic and comparative study of languages was begun near the end of the 18th century, when Schlegel, and, before him, Sir William Jones, discovered the relation between Sanskrit and Greek and Latin. Franz Bopp is considered the founder of scientific philology; closely connected with his researches is the work of Jacob Grimm, the father of historical grammar. Other scholars whose names are prominent in philological research are August Schleicher, Max Müller, William D. Whitney, Humboldt, Steinthal, Brugmann and Paul. The study involves many problems difficult to solve, due to the limited store of adequate information which historical and archæological research supplies. Various attempts at classification of languages have met with deficient and inadequate results, as recent investigations constantly prove.

Classification. The classification of languages is not equivalent to the classification of races, for no language is a race-characteristic, but is transferable like other social institutions—art, religion, etc. Rather, it is sufficient merely to say that language is only a probable indication of race. Of the two general classifications, according to race indication and according to language structure, the latter will be considered first.

The structure of languages causes them to be divided, roughly, into the isolating (or monosyllabic), agglutinative and inflective types. The isolating, or monosyllabic, group consists principally of the Chinese language, which has invariable monosyllabic roots. Every word is a monosyllable and is an integral sign. Inflection of words, derivation and formal division into parts of speech are wholly lacking. It has recently been proved that even the Chinese language, however, had a development, but that through phonetic decay similar to that which is destroying many English forms, it was reduced once more to the simple state in which it is now found.

Agglutinative languages are those whose words are formed by a root and added prefixes, suffixes or infixes. Their separate values remain distinct, due to their loose combination with the word itself. To this group belong the African, Dravidian, Uro-Altaic and Malayo-Polynesian languages. In the English languages traces of this process are apparent in words like *un-fail-ing-ly, faint-hearted, talk-a-tive-ness,* etc. The Indian tongues are rich in agglutinative forms of this type.

When these additions, through usage, gradually merge with the word itself and lose their identity, inflexional languages are formed. Instead of agglutination, the language undergoes internal change, and in the various types, parts of speech and root and stems are formally distinguished, the verbs are conjugated and nouns, pronouns and adjectives are declined. In these respects the many languages reveal wide varieties. Here belong English, Italian, French, Hindu-

stani, Persian, Greek, Latin, German, Arabic, Hebrew and Sanskrit.

On the basis of historical connection languages are divided into the following large groups: Indo-European, Semitic and Hamitic. Minor divisions include Mono-syllabic, or Southeastern Asiatic, Ural-Altaic, Dravidian, Malayo-Polynesian and other Oceanic families, Caucasian, Bantu and other African groups and American (North American Indians).

The Indo-European group is composed of the two main divisions, the Western and the Eastern. To the Western belong Greek, the Italic languages (Latin, Oscan, Umbrian), Celtic and the Germanic, or Teutonic (Gothic, Swedish, Danish, Norwegian, Icelandic, English, Frisian, Low Frankish and Low and High German). The Eastern includes the Aryan (Sanskrit, Zend and Old Persian), Armenian, Balto-Slavonic (Old Bulgarian, Russian, Polish) and Albanian. Without doubt, this family of languages includes the people that have occupied the most important position, historically, among the peoples of the world. Its literature, both modern and ancient, is by far the richest, and this fact has brought about the condition that the language groups are the most stable and the most easily studied of all in existence. It has become the basis of almost all comparative philological study.

The Semitic family is easily second in importance, and its peoples, the Hebrews, Assyrians, Phœnicians, Arabs, Abyssinians and Syrians have played a significant part in Biblical history, as well as through the literature they have given to the world.

The Hamitic group is represented by one important family, the Egyptian. Egyptian proper is limited to the valley and delta of the Nile. Other divisions are the Libyans and Berbers of northern Africa and the Ethiopic division of the southern part of the continent. Of other large groups not included in the three divisions indicated above, are the Chinese and Japanese, both of which are coming into prominence as a result of the great interest manifested in the varied activities of these nations within recent years.

The important languages are the Sanskrit, Hebrew, Greek, Latin, Romance and Teutonic. English, a division of the last, is given separate treatment because of its relative importance.

Sanskrit Language. The Sanskrit language was once applied to the whole ancient language of India. During the last 2000 years its life has been artificial, like that of the Latin during the Middle Ages, and has been chiefly the language of the educated and the priests. No event in the history of culture, since the revival of learning during the Middle Ages, has equaled in importance the discovery by Europe of the Sanskrit language in the 18th century. It gave rise to, or furthered, the study of linguistic science, as well as comparative jurisprudence and mythology, the science of religion and varied phases of historical and philosophical study.

Hebrew Language. The Hebrew language, belonging to the Semitic group, is of importance by reason of the fact that it forms the language of the bulk of the Old Testament. The Jews of Palestine gradually used Aramaic, rather than Hebrew, as their current speech, and those who lived outside of Palestine adopted the languages of the country which they inhabited, and the Hebrew became, *par excellence,* the language of the Bible and the official language of the synagogue. There have been numerous literary revivals of the Hebrew, for this reason, and a study of it has constantly been cultivated. It cannot now be called a living language, as it is artificially maintained and still modeled upon Biblical style.

Greek and Latin. The Greek and Latin languages represent the highest development of ancient thought and culture. The Greek, through constant development, came to be known as the most flexible and the most beautiful of languages. The principal dialects were the Æolic, Ionic, Doric and Attic. After the conquests of Alexander the Great (330 B. C.) the Attic became the language of the

Greek world, which at this time had been spread to cover a large part of southwestern Asia. By 800 A. D. the differences between the spoken and written Greek were so marked that the literary language lost its foothold, and this date marks the beginning of modern Greek. The Greek of today, suffering from the gap caused between the spoken and the written word, is far less musical and less pure than the language of the golden age of the literature of that country. Latin was the language of ancient Rome, and it belonged originally to the Indo-European group, hence was not original in Italy. Several dialects and tongues were used by the tribes that invaded the country in prehistoric times, and of the whole Italic group which developed, the Latin was the only tongue which became a literary language. It became practically the language of the whole Western civilized world during the time the Romans held unlimited sway. It was for centuries the political, official and ecclesiastical language of Europe, but finally deteriorated through the complete dissolution of the Roman Empire. From this language sprang the different Romance tongues of modern Europe: Italian, Spanish, Portuguese, Provençal, French and minor divisions.

Modern Romance Languages. The principal members of this group are the Italian, Spanish and French. The Italian, of which the Tuscan dialect represents the purest form, is rich in poetic forms and is highly musical. The written language of the country has been made uniform by the writings of Dante, Petrarch, Boccaccio and others, but the oral speech remains a curious mixture of dialects. The French language contains elements of the original Latin tongue, as well as of the Celtic and Norman groups. During the ninth and tenth centuries the differences between the dialects spoken in northern and southern France were very marked. The first was known as the *Langue d'oc*, and has become the French of today. The other, the *Langue d'öil*, has become modern Provençal. The two words *öil* and *oc* represent the northern and the southern words for "yes." During the 16th century definite attempts were made to make permanent various grammatical forms of the French language and to fix the vocabulary. As a result of these efforts, as well as an invasion of Italian and Spanish words, much of the original picturesqueness of the language was lost. With the centuries that succeeded, it constantly gained in accuracy and clearness, until it is now among the most refined of tongues in the world. It is spoken by about 40,000,000 people, chiefly in France, Belgium, Switzerland and a part of Canada. Spanish is the tongue of the inhabitants of Spain, Mexico and a large portion of South America. The basis of its vocabulary is the Latin, while the influence of other tongues, as the Iberian, Celtic, Visigothic, is apparent by the few traces they have left. The Moorish invaders introduced many Arabic words.

Teutonic Languages. To the Teutonic group belong principally the German and the Scandinavian languages. German was early divided into a large number of dialects. Geographically, the divisions are the High German, or the language spoken in the highlands of the country, chiefly in the southern part, and the Low German, including the dialects of northern Germany and of parts of Belgium and Holland. There are three main periods in the history of High German: Old High German, extending from the 8th to the 12th century; Middle High German, from the 12th to the 16th century; and Modern German, from the 16th century to the present day. Luther's translation of the Bible in 1522 marks the beginning of an established modern form, and its rapid spreading through the country caused this form of the language to be generally adopted. However, it must be noted that Luther did not found the language which he used, but rather, to borrow his own expression, had recourse "to the common German language so that both High and Low Germans may understand." Since 1750 the literary language of Germany

has been fairly permanently established.

The Scandinavian group of languages includes the Icelandic, Danish, Norwegian and Swedish. In Iceland it is curious to note that the Old Norse has remained perhaps more unchanged than any other language in existence, within the course of ten centuries or more. Traces of this Old Norse influence still exist in the other languages of the group. They closely resemble one another, and are all fairly intelligible to those who understand one of the group.

English Language. The English is the principal medium of communication used in the British Empire and in the United States. It belongs originally to the Teutonic group, and was used by the Teutonic invaders of the island during the last part of the fifth century. Three periods are distinct in the growth and development of the English language. The Anglo-Saxon, or, better, the Old English, period extends from 449 to 1100 A. D.; the Middle English, from 1100 to 1500; the Modern, from 1500 to the present time. After the Norman Conquest the French language was introduced as the language of the court and of the law, and the inhabitants of England refusing to adopt it, the result was that for nearly 200 years the two languages were spoken. Gradually they merged, and modern English shows distinct traces of both influences. The original language of the island used for literary purposes is divided into the Northern, Midland and Southern dialects. The Midland, avoiding the extremes of the other two, finally became the parent of the literary language now in use in England. The most marked changes that are now taking place are in the way of vocabulary, for the language bears evidence of a generous borrowing of words from all the peoples with whom England has come into political or social contact. One of its most striking features is this composite character—a free adaptation from foreign languages of words suited to its usage.

Lanier, *La neer',* **Sidney** (1842-1881), an American musician, soldier and poet, born in Macon, Ga. He graduated at Oglethorpe College, Georgia, and entered the Confederate army shortly after the capture of Ft. Sumter. After the war he taught in a country school and later joined his father in the law office at Macon. In 1873 he decided to give himself up wholly to music and poetry, and upon going to Baltimore and New York became recognized as a flute player of distinct ability. He was made lecturer on English literature at Johns Hopkins University in 1879. The last years of his life were spent in the South, his premature death being caused by consumption. In all his work, Lanier, like Poe, is dominated by the idea of beauty in art, and because of his exquisite verse is ranked as the greatest Southern writer since Poe. Both poets emphasize the musical elements of poetry; Lanier adds the ethical note. His prose works include *The English Novel, The Science of English Verse* and *Letters.* He adapted tales for boys from Malory, Froissart, the *Mabinogion* and Percy's *Reliques.* Among the most delicate and charming poems are *The Marshes of Glynn, The Song of the Chattahoochee, Corn* and the cantata sung at the Centennial Exposition in 1876.

Lans'ford, Pa., a city of Carbon Co., 6 m. n.e. of Tamaqua and 35 m. n. of Reading, on the Central of New Jersey Railroad. It has extensive coal-mining interests, being situated in the productive anthracite fields of the state. There are large machine shops, coal breakers, etc. The borough was settled in 1845 and incorporated in 1876. Population in 1920, 9,625.

Lan' sing, Mich., a prosperous city of Ingham Co., and capital of the state, 85 m. n.w. of Detroit and 64 m. s.e. of Grand Rapids, at the confluence of the Grand and Cedar rivers and on the Pere Marquette, the Michigan Central, the Lake Shore & Michigan Southern, the Chicago & Grand Trunk and other railroads. A number of interurban electric lines also connect the city with Detroit, Kalamazoo, Battle Creek and many other towns and cities of this populous portion

of the state. A number of bridges span the rivers at this point. Lansing is situated in a fertile agricultural region and occupies an elevated site on a plateau rising above the level of the rivers. Lansing has an area of nine square miles, with wide and beautifully shaded streets and handsome residences. Capitol Park in the center of the city covers about ten acres. Moore's Park and Riverdrive are attractive resorts. The most noteworthy building is the state capitol, erected in 1873-78, at a cost of $1,500,000. This building also contains the state library. Other important buildings are the city hall, Government Building, Union Depot, Elks' Home, Masonic Temple, hotels, theaters, banks and Y. M. C. A. and Y. W. C. A. buildings. There are about 30 churches.

The educational institutions include the Central High School, several public libraries, a number of business colleges and public and parochial schools. The Michigan State Agricultural College (coeducational) is located in East Lansing. This is the oldest agricultural college in the United States and was opened in 1857. In connection with the college there is an agricultural experiment station. Lansing is the seat of the Michigan School for the Blind and the Michigan State Industrial School for boys. There is a city hospital. Lansing is extensively engaged in the manufacture of automobiles and gas engines, and has large manufactories of motors, pumping engines, sash, doors, hand trucks, wheelbarrows, brass goods, ornamental lamp-posts, power-spraying machines, agricultural implements, steel castings, cut glass, engines and boilers, brick and tile, screws, beet sugar, knit goods, flour, stoves, trunks, canned goods, elevators, artificial stone, barrels, steam thrashers, show cases and other products.

The first settlement was made in 1837. The site of the place was covered with forests when the seat of government for the state was located here in 1847. A city charter was granted in 1859 and a recharter given in 1893. Population in 1920, U. S. census, 57,327.

Lantern Fish, the name applied to certain deep-sea fishes because they possess organs which give light necessary for them to see in the deep water in which they live. Many of these fishes have peculiar forms and present a grotesque appearance.

Lantern Fly, a family of insects of the order Hemiptera. The members of the family known in North America are small and insignificant; in South America the representatives are larger and gaudily colored. Probably the best-known lantern fly of the United States is a green seedlike creature with wings vertically flattened and slightly humped back. These lantern flies are frequently seen on the underside of grape leaves. The various members of the family differ greatly, but the majority may be found feeding upon grass and leaves. Those from South America do great damage to growing crops; those of China and the East Indies are phosphorescent. See HEMIPTERA.

Laocoön, *La ok' o on,* in early Greek myths, a Trojan priest of Apollo who argued vehemently against receiving into Troy the wooden horse of the Greeks. While he was sacrificing a bullock to Neptune for his countrymen, Minerva sent upon him two huge serpents, which, winding about him and his two sons, crushed them to death. This was accepted as a sign of divine anger for his having doubted the holiness of the horse. In reality, it was spite work of Minerva, to whom the Greeks had dedicated the wooden monster. *The Laocoön,* now in the Vatican, discovered in 1506, is famous in sculpture. See WOODEN HORSE; TROJAN WAR.

La'pis Laz'uli, a mineral substance of a beautiful ultramarine or azure color. It occurs in granite and in crystalline limestone, its most important localities being Siberia, China, Persia and Chile. It was the sapphire of the ancients and was used in jewelry by the Egyptians. It is today employed in engraving, ornamental and mosaic work, altars and vases. The pulverized stone produces the pigment ultramarine.

Laplace, *La" plahs',* **Pierre Simon,** Marquis de (1749-1827), a French mathematician and astronomer, the originator of the famous nebular hypothesis. He was born and educated at Beaumont-en-Auge, where he also taught; in 1767 he went to Paris to become professor of mathematics in the Ecole Militaire. He won honored recognition for his original work and became a member of both the French Academy and the Academy of Sciences. He held several important government positions but was successful only in those which necessitated the use of his keenest scientific ability. He is known for his discovery of the inequality in the movement of Jupiter and Saturn, his theory of tides, his improvements of the lunar theory and his work in the establishment of the metric system. In 1818 the French Government issued a collection of his works in 13 volumes. See Nebular Hypothesis.

Lap'land, a region in northern Europe, which derives its name, not from any political division, but from the fact that it is the home of the Lapps. The territory includes the whole northern part of Norway, Sweden, Finland and the Russian Kola Peninsula, and embraces an area of about 150,000 sq. m. The climate is very severe for nine months in the year and the snowfall is heavy. Elevated tracts of the surface are barren; in the valleys are lichens and mosses for the sustenance of the large herds of reindeer on which the inhabitants depend for their chief wealth. The Laplanders are short in stature, with high cheek bones, small, black eyes and black or chestnut hair. They are honest, patriotic and hospitable, but generally ignorant. They number about 30,000, and not any of the Lapps proper live in towns or villages.

Laporte, *La port',* **Ind.,** a city and county seat of Laporte Co., 28 m. w. of South Bend and 59 m. s.e. of Chicago, on the Lake Shore & Michigan Southern, the Lake Erie & Western, the Pere Marquette and other railroads. The city is a popular summer resort having several attractive lakes. It is the farming trade center of the county and has manufactories of agricultural implements, woolen goods, thrashing machines, traction engines, automobiles, bicycles, metal wheels, furniture, flour, sash, blinds and doors, hubs and pianos. St. Rose's Academy is located here. There is a public library. Laporte was incorporated as a town in 1832 and chartered as a city in 1852. Population in 1920, 15,158.

Lap'wing", or **Pe'wit,** a bird of the Snipe and Plover Family. It is about the size of a pigeon. The upper parts are green with a purplish gloss, the head and breast are black, the under parts and sides of the neck are white, and the upper part of the tail is black and the lower part white. There is a little yellow on the tail coverts and an erect crest is developed on the head. The carefully concealed nest is shallow, made of grass, and contains four pear-shaped eggs spotted with dark brown. The lapwing ranges throughout northern Asia and Europe, where it is hunted, and many birds, as well as the eggs, are sent to market.

Lar'amie, Wyo., a city and the county seat of Albany Co., 57 m. n.w. of Cheyenne, on the Big Laramie River and on the Union Pacific and other railroads. It is situated in the midst of a large mining and stock-raising section, of which it is the trade center. Among the industrial plants are rolling mills, machine shops, plaster mills, soda works, flour mills and glass factories. Laramie is the see of the Protestant Episcopal missionary bishopric of Wyoming, and contains several notable institutions, among them the state university, the state agricultural experiment station, the state fish hatchery, the state penitentiary and St. Joseph's Hospital. There are public and college libraries. Settled in 1868, Laramie was incorporated in 1869 and was first chartered as a city in 1884. Population in 1920, U. S. census, 6,301.

Larceny, *Lar' se ny,* the wrongful or fraudulent appropriation by one person, of personal property of another, with intent to convert such property to his own use without consent of the owner.

To constitute larceny, the goods must actually pass into possession of the criminal. Larceny is practically the same as robbery, and the details of punishment vary in different states; in nearly all states, however, the crime is punishable by imprisonment, the length of time being determined to some extent by the value of the property stolen.

Larch, a tall tree of the Pine Family, with horizontal branches and erect trunk. The American larch, which is most frequently found in North America and is common from the Arctic Ocean to northern Illinois, grows from 60 to 80 ft. high and bears on its older branches small clusters of short, needlelike leaves, that fall in the autumn; on the younger branches the leaves grow singly. The flowers are of two kinds, but those which are to bear the fruit are the only conspicuous ones, and they produce short, roselike cones that are artistic in form. The European larch is taller and has longer leaves, which don beautiful autumn tints before falling.

The timber of the larch is not useful for planks because it warps easily, but, being protected against insects and decay by the quantities of resin which it stores, and having a long, tapering form, the tree is useful for masts, telegraph poles, posts, supports and scaffolding. The Romans built their bridges of larch and considered them fireproof.

In Canada and eastern United States, the larch is generally called hackmatack; in the Central States, tamarack. Other species of larch are the Japanese, the western and the Himalayan; the western produces the largest and most valuable timber of any pine. The red fir is frequently called the larch. See FIR.

Larcom, *Lar' kum,* **Lucy** (1826-1893), an American poet, born in Beverly, Mass. While she was working in the mills at Lowell, Mass., she contributed to the journal, *Lowell Offering.* Later she compiled with Whittier *Child-Life* and *Songs of Three Centuries.* She studied at the Monticello Female Seminary in Illinois and afterwards taught in the Wheaton Female Seminary in Massachusetts. She was assistant editor and editor of *Our Young Folks* from 1865 to 1874, and spent the last years of her life at Beverly Farms, Mass. Among her works are *Similitudes, Ships in the Mist and Other Stories, The Sun-Beam, and Other Stories* and *Leila Among the Mountains.*

Lard, the fat of the hog. Leaf lard is that obtained by rending the layers of fat around the kidneys, and is the best grade of lard procurable. The lard of commerce is obtained by subjecting the entire carcass of the hog to the treatment of superheated steam in closed vessels. By this method all the fat is extracted. The lard is then freed from water by subjecting it to heat in open vessels or vacuum pans. It is then partially cooled and run into cans or other vessels for market. Lard is used for cooking, in the manufacture of butterine and for numerous other purposes. Originally it was used only for cooking and as the base of ointments. See MEAT PACKING; OLEOMARGARINE.

Laredo, *La ra' do,* **Tex.,** a city and county seat of Webb Co., 154 m. s.w. of San Antonio, on the Rio Grande River, opposite Nuevo Laredo in Mexico, and on the Mexican National, the International & Great Northern, the Rio Grande & Eagle Pass and the Texas Mexican railroads. There is an excellent water supply. Laredo is one of the most important customs ports on the border between Texas and Mexico, and two international bridges cross the river at this point. Among the chief exports are brick, wool, live stock, coal, ores and Bermuda onions. The industrial plants include brickworks, foundries and machine shops, a number of tobacco factories, flour mills and broom and ice factories. Features of interest are a fine Federal Building, courthouse, Ursuline Convent, Laredo Seminary (Methodist Episcopal, South), established in 1882, a market house and 26 city parks or squares. The first settlement was made here by Spaniards in 1767. The city was incorporated in 1848. Population in 1920, U. S. census, 22,710.

Lares, *La' reez,* **and Penates,** *Pe na' teez,* lesser domestic gods of the Romans. The Penates were supposed to be of divine origin. They protected and blessed bountifully the interior of the home. The Lares, spirits of the dead who returned to watch and guard their descendants, supposedly cared for the house from without. Having lived on earth, they knew best from whence came snares to men. Images of dogs were often placed beside the Lares, which, with the Penates, were represented by small statues. These were the family's most treasured possessions.

Lark, a name applied to a family of perching birds noted as sweet songsters. There are about 100 species known in Europe, Asia, Africa and America. In all of these the hind toe is peculiar in having a long, straight claw, and the long, pointed wings indicate exceptional powers of flight. The skylark is the best-known example of the true lark, and in America the family is represented by the horned larks, of which there are more than 13 species and races.

Horned Lark, or Shore Lark. This bird is a little smaller than the robin and is dull brown, tinged with pink above and white with dusky spots below; the tail is black with white-margined outer feathers; the throat is yellow and there is a crescent-shaped black patch on the breast. The nest, which is made of hay or grass, is on the ground, and contains three or four eggs marked with brown. The horned larks spend the summer and rear their young in the Far North; there alone is heard the beautiful song, which, like that of the skylark, is sung when the bird is on the wing. In the winter these larks gather in large flocks in eastern United States.

Lark Bunting, a shy bird of the Finch Family, about the size of the English sparrow and easily recognized by its black color, white wing patches and white marks on the tail. The female is brown, streaked with blackish above, and with black and white below. The wing patch is smaller than in the male. The nest is made of grass and rootlets and is sunk in the ground, usually under a clump of weeds. Four to five blue eggs are laid. The lark bunting occurs in large flocks on the plains and prairies in summer, but they winter in Mexico. During the nesting season they have a pleasant and rich song.

Lark'spur, an herb of the Crowfoot, or Buttercup, Family. It has much-divided leaves and odd-shaped flowers, the upper sepal having a long, curved spur, and the petals being irregular in form. The flowers are blue, white or pink. The dwarf larkspur is common west and south of Pennsylvania and is often called the staggerweed. Tall larkspur has showy clusters of flowers with straight spurs. This species often grows over five feet in height. Other species, all of which may be recognized by the flower, are escapes from gardens, where they were brought from Europe and Siberia. The larkspur flowers all summer and autumn.

LARKSPUR

Larks'ville, Pa, a city of Luzerne Co., 3 m. n.w. of Wilkes-Barre, in the Wyoming Valley. It is surrounded by picturesque mountain scenery. Larksville is essentially a mining town and is situated in the heart of a rich anthracite field. It has large coal breakers and facilities for shipping great quantities of coal. Population in 1920, 9,438.

Larynx, *Lar' inks,* the organ of speech. It is the section of the air pas-

sage situated between the hyoid bone above and the windpipe below and lying well to the front of the neck. It is a box-shaped framework consisting of nine cartilages held together by ligaments and membranes, and regulated by muscular movement. The chief of these cartilages are: the thyroid, which forms the two side walls of the larynx and meets in an angle in front, causing a protuberance known as Adam's apple; and the cricoid, which is shaped like a signet ring and which forms with its broad side the back wall of the box. On the upper front edges of the cricoid cartilage rest the two small, triangular, arytenoid cartilages. Between these and the inner front wall of the thyroid are stretched two bands of elastic tissue in the form of a V. These are the true vocal chords. The opening between them is the glottis. The false vocal chords are membranes lying near the outer edges of the true vocal chords and above and parallel to them. The depression between the true and the false vocal chords is the ventricle of the larynx. The epiglottis is a cartilaginous shield which springs like a leaf from the inner angle of the thyroid, and, extending upward and backward, constitutes with its tip a sort of flap which covers the glottis during the process of swallowing, and which rests perpendicular during quiet breathing. See VOICE.

La Salle, *La Sal'*, **Ill.,** a city of La Salle Co., 60 m. n. of Bloomington and 99 m. s.w. of Chicago, on the Illinois River at the head of navigation, and on the Illinois Central, the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific railroads. There are zinc smelters and zinc-rolling mills and manufactories of hydraulic and Portland cement, common and ornamental pressed brick, sulphuric acid, tools, clocks and machinery. Transportation facilities make of the city an important commercial center. Among the chief features are a public library and a fine railroad bridge spanning the river. La Salle was settled in 1830 and was chartered in 1852. Population in 1920, 13,050.

LA SALLE

La Salle, René Robert Cavelier, SIEUR DE (1643-1687), a French explorer, born in Rouen, France. Early in life he became connected with the Jesuits, and probably taught in their schools, but he soon left them and joined the Sulpicians, in which order his brother was a priest. He went to Canada in 1666 and secured a grant of land on the banks of the St. Lawrence River above Montreal. The grant was in an exposed position, and considered of but little value. In 1669 La Salle sold his grant and started on an exploring tour. In this and succeeding expeditions he discovered the Ohio River, which he descended as far as the rapids at Louisville, descended Lake Michigan to Mackinac and explored the upper part of the Illinois River. In 1674, on the recommendation of Count Frontenac, governor of Canada, La Salle obtained a patent of nobility and a grant of Ft. Frontenac and adjacent land, constituting the site of Kingston, Ontario. This was a strategic point and favorably situated for the fur trade.

From the reports of Marquette and Joliet, La Salle was convinced that the Mississippi River flowed into the Gulf of Mexico, and he conceived the plan of descending this river to its mouth and taking possession of all the region drained by its waters in the name of the King of France. In 1674 he went to France and laid his plan before the King, being the first to give an account to Louis XIV of the inexhaustible resources of the Mississippi Valley. He was given authority to continue his explorations westward, a right to new lands discovered, provided his expeditions were conducted without expense to the King. In 1678 he returned to Canada, bringing with him Henry de Tonty and the friar Louis Hennepin. See TONTY, HENRY DE; HENNEPIN, LOUIS.

But a knowledge of La Salle's plans had spread abroad among the French traders and the Jesuits; consequently these organizations placed every possible obstacle in his way. Notwithstanding this opposition, La Salle and his follow-

ers reached the lower end of Lake Erie late in the autumn of 1678. During the winter they built the *Griffon,* the first sailing vessel constructed upon the Great Lakes. In the spring of 1679, with a small company, including Tonty, La Salle embarked in the *Griffon* for a voyage upon the lakes, and went as far as Green Bay. The *Griffon* was laden with furs with which to satisfy his creditors, and sent upon her return voyage. Nothing further was ever learned of the ship or crew.

La Salle and his followers went overland to the Illinois River, and descended that stream to a point near the present city of Peoria, where, in the winter of 1680, he built Ft. Crèvecœur. Two years later he descended the Mississippi to its mouth and took possession of the country for the King of France, naming it Louisiana in honor of Louis XIV.

During the next two years he was engaged in erecting forts and organizing an Indian confederation to resist the attacks of the Iroquois. This confederation clustered around Fort St. Louis, erected upon a bluff on the Illinois River near the present village of Utica and now known as Starved Rock. He then returned to France and was made commandant of all the region he had discovered. He returned with colonists and supplies for establishing a colony at the mouth of the Mississippi River, but they mistook Matagorda Bay for the mouth of the river. Two of the ships were wrecked and most of the supplies lost. After the ships had departed La Salle discovered his mistake, and heroically resolved to go on foot to Canada to obtain assistance for the colony. Soon after setting out, he was shot by one of his followers.

La Salle was a man of great vision, almost superhuman energy and remarkable endurance. Next to Champlain he was the greatest of the French explorers, and to him more than to any other is due the credit of planting the seeds of civilization in what is now the Central West. Consult Parkman's *La Salle, and the Discovery of the Great West.*

Las Casas, *Lahs Kah' sahs,* **Bartolomé de** (1474-1566), a Spanish priest and missionary, known as the "Apostle of the Indies." He came to the New World in 1502 and assumed charge as prelate of Cuba, where he distinguished himself for his kindness to the natives. As a missionary he also visited Mexico, Guatemala and Peru, and in 1544 he was consecrated Bishop of Chiapa. His *Historia general de las Indias* is the source of much valuable information on the Spanish discoveries and conquests in the New World.

Lassa, *Lahs' sah.* See LHASA.

Lassalle, *La" sal',* **Ferdinand** (1825-1864), a German Socialistic writer, born at Breslau. He was educated at Leipsic, Breslau and Berlin, and early became a radical disciple of Karl Marx. In 1848 he was condemned to six months' imprisonment for his outspoken criticism of the reactionary party, and in a few years he was openly the champion of the working classes. His pamphlets created a general interest in Socialism among the working people, and he is regarded as the virtual founder of the German Social Democratic Party. His writings, learning and fascinating personality influenced profoundly the German labor movement.

Las Vegas, *Lahs Va' gas,* **N. M.,** a city and county seat of San Miguel Co., 83 m. e. of Santa Fe, on the Gallinas River and on the Atchison, Topeka & Santa Fe Railroad. The city lies in a beautiful valley at the foot of the chief range of the Rocky Mountains, about 6400 ft. above sea level, and is a noted health resort. Near the city are the celebrated Las Vegas hot springs. The city consists of the old town on the west bank of the Gallinas River and the new city proper on the east bank. The old town retains many features of the old Mexican village, with narrow streets and adobe buildings. The new city is modern, with wide and shaded streets and many handsome residences. The noteworthy buildings include the county courthouse, post office, the New Mexico Hospital for the insane, St. Anthony's

Sanatorium, La Salle Institute, New Mexico Normal University, opened in 1898, a Presbyterian mission school and a Methodist commercial and manual-training school.

Las Vegas is situated in a grazing region. It has large stockyards and ships great quantities of wool. The city is the division headquarters of the Atchison, Topeka & Santa Fe Railroad for New Mexico, and there are large railway machine shops and various manufactories. After the arrival of the railway in 1879 the town had a rapid growth. In 1888 the town on the eastern side of the river was incorporated as East Las Vegas, and in 1896 a charter was granted as the city of Las Vegas. In 1903 the old town of Las Vegas was incorporated. Population in 1920 of Las Vegas City, 4,304; of old Las Vegas, 3,902.

Lat'eran, Church of St. John, a church edifice in Rome, occupying the site of the palace of Plautius Lateranus, later used as an imperial residence. The present church was built by Urban V (1362-70), but has been greatly modernized. This is the first in dignity of the Roman Churches, and the entrance of the pope into office is here celebrated. The modern Lateran Palace, in connection with the church, was built by Sixtus V. It is under the control of the Government of Italy and contains a valuable museum of Christian archæology.

Lathe, a machine for shaping articles by turning them, hence frequently called a turning lathe. Lathes are of two general classes, those for working metal and those for working wood. A lathe for working metal consists of an iron frame, upon which are mounted two headpieces, one stationary and the other movable, and a carriage for holding and carrying the chisel. The stationary headpiece has a rotating disk, to which a set of pulleys is attached, and to which one end of the article to be turned is fastened. The movable headpiece slides from end to end of the frame, and can be held in position at any point by a screw. This arrangement enables articles of different lengths to be fastened in the lathe. The carriage holding the chisel is given a horizontal motion by a screw. Motion is imparted by belting the stationary headlock to a pulley on shafting or by an electric motor attached directly to the lathe. The chisels are of peculiar shape, and there are numerous patterns. Metal-working lathes usually have a slow motion. The speed can be varied by placing the belt on different-sized pulleys attached to the headblock.

Lathes for turning wood and vegetable ivory are much simpler than those for working metals. They run at a high speed, and the chisel is usually held in the hands of the operator. Small lathes of this sort are sometimes operated by foot power.

La'throp, George Parsons (1851-1898), an American author, born in the Sandwich Islands and educated in New York City and in Dresden, Germany. Having studied law, he successively edited the *Atlantic Monthly* and the Boston *Courier*. In 1871 he married Rose, daughter of Nathaniel Hawthorne, and for a time he lived in the Hawthorne home, The Wayside, Concord, Mass. He excelled both in prose and poetry, was a prominent editorial writer and an art and literature critic.

Lathrop, Julia Clifford (1858-), an American social worker, born in Rockford, Ill. After spending two years at Rockford College she entered Vassar, graduating in 1880. For years she was a resident worker of the famous Hull House social settlement in Chicago. She is a member of the Illinois State Board of Charities and vice-president of the Chicago School of Civics and Philanthropy, which she helped to found, and was also instrumental in the establishment of the Chicago Juvenile Court. She has made several trips abroad for the purpose of studying European methods of caring for the insane, and in her own country has been influential in securing laws for the improvement of social conditions. It was in recognition of her efficiency and fitness for the office that in 1912 President Taft appointed her

director of the new Federal Children's Bureau. Miss Lathrop is the author of several reports and articles on the care of the insane, civil service and kindred subjects.

Lat'imer, Hugh (about 1485-1555), an eminent English reformer and martyr, born in Leicestershire and educated at Cambridge. After identifying himself with the Reformation movement, he came into prominence as one of the clergymen who were appointed to examine the legality of Henry VIII's marriage with Catharine of Aragon. He declared for the King's side, was appointed one of Henry's chaplains and in 1535 became Bishop of Worcester. He preached the new doctrines with great earnestness and vigor, but when the reactionary party gained favor at court he resigned his bishopric (1539) and lived for several years in privacy. He resumed his preaching on the accession of Edward VI, but after Mary came to the throne he was arrested and imprisoned. After spending a year in jail, he was tried and condemned to die at the stake. Latimer and Ridley were executed together, opposite Balliol College, meeting their fate with heroic courage.

Latin Language. See LANGUAGE, subhead *Greek and Latin.*

Lat'itude, in geography, the distance of any place from the equator measured in degrees of the meridian of that place. Applied to astronomy, the term means the angle which any line perpendicular to the plane of the earth's horizon makes with the plane of the equator. Latitude is determined by astronomical observation and is reckoned from the equator to the poles, latitude at the equator being zero; at the poles, 90° north and 90° south respectively.

Latter Day Saints. See MORMONS.

Latvia, that section of the old Russian Empire embracing the Gulf of Riga including surrounding territory in which the population is Lettish,—the old provinces of Courland, the southern part of Livonia and small sections of Vitebsk. An area nearly as large as our state of West Virginia. Ethnically, the Letts are near akin to the Lithuanians on the south, but diverse from the Esths on the north and the Slavs of Russia. Anciently, their country was ruled by the German religious order of the Brothers of the Sword and the land has largely remained in the hands of German landlords who oppressed the native peasants. Courland and Livonia were both, so called, German provinces of Russia. Like the other Baltic provinces, they passed under the rule of Russia in the days of Peter the Great. At the conclusion of the World War, this section adopting the name of Latvia, Land of the Letts, declared its independence. What will be its future relations with Russia cannot now be stated. It is thought by many that they will unite politically with Lithuania. (See BREST LITOVSK.)

Laud, William (1573-1645), Archbishop of Canterbury, born at Reading, England. He became Archbishop of Canterbury in 1633. As archbishop he maintained severe proceedings against all Nonconformists, hunting them out by means of spies and imposing fines, imprisonment and exile. Laud was impeached for high treason by the Long Parliament and the House of Commons declared him guilty. He was beheaded on Tower Hill on Jan. 10, 1645.

Lau'danum, a preparation of opium made by softening it in alcohol and filtering off the resulting liquid. Its strength is regulated by law in the United States. Medicinally, laudanum is often prescribed to allay pain and to produce sleep, but its effects are apt to be harmful and it should never be taken without a physician's prescription. To children, laudanum is especially liable to be fatal.

Laughing, *Lahf'ing,* **Gas,** or **Nitrous Oxide,** a gas discovered by Priestley, but found by Davy to be useful as an anæsthetic. When inhaled it produces a peculiar effect upon the nervous system, inducing a hysterical condition, generally accompanied by noisy laughing or weeping, later, insensibility, and finally death. It is extensively employed as an anæsthetic in dentistry. It is then forced

into iron cylinders under great pressure. When needed for use the dentist liberates a small portion which expands and fills a rubber bag, from which it is administered to the patient. Nitrous oxide is a colorless gas with an agreeable taste and odor. It is generally prepared by the decomposition of ammonium nitrate by heat, but when used as an anæsthetic must be carefully purified.

Laughing Jack'ass", a bird of the Kingfisher Family, living in the thinly-timbered regions of New South Wales. It is nearly 18 inches long, and is brown above, more or less greenish or bluish on the lower part of the back, and white below; a broad band of this color extends around the neck and above the eye. The tail is reddish, barred with black, and the tips of all but the two central feathers are white. The nest is placed in a hole in a tree and contains two white eggs. This bird receives its name from its peculiar harsh cry, which is said to sound like the braying of an ass. It is much tamer than the common kingfisher.

Laughlin, *Laf' lin,* **James Laurence** (1850-), an American lecturer and political economist, born at Deerfield, Ohio, and educated at Harvard. From 1878 to 1887 he was connected with his alma mater, first as instructor and then as assistant professor. After three years as president of the Manufacturers' Mutual Insurance Company of Philadelphia, he became professor of political economy at Cornell. Since 1892 he has been head of that department in the University of Chicago and editor of the *Journal of Political Economy.* In 1894-5 he prepared a scheme, subsequently adopted, for monetary reform in Santo Domingo. His works include *Elements of Political Economy, Gold and Prices Since 1873, Facts About Money, Principles of Money* and *Reciprocity.*

Lau'rel, a tree of warm climes belonging to the Laurel Family and scarcely known in temperate or colder zones. The true laurel is a large tree, having spicy wood and foliage. The leaves are long, gray-green in color and envelop the stem. The flowers grow in closely-crowded but inconspicuous bunches in the joints of the leafstalks and main stalks. The fruit is a berry.

In ancient legend the laurel was said to have power to stay evil, and from this came its use as an emblem of victory. It is also said to confer the gift of poesy upon its wearer, and to this symbolism we owe our words *baccalaureate* and *poet laureate.* The sweet bay, a native of Mediterranean regions, is the only true laurel growing in other than tropical climates. Other nearly related species are the sassafras and the benzoin, or spice wood. Mountain, or American, laurel is a shrub of the Heath Family technically called kalmia. See KALMIA.

Laurel, Miss., a city of Jones Co., 110 m. n.w. of Mobile, Ala., on the Queen & Crescent Route, the Mobile, Jackson & Kansas City, the Gulf & Ship Island and other railroads. The city owes its importance to its numerous sawmills, the first of which were erected in 1890. Besides the lumber interests there are several other industries, and the city contains cotton mills, knitting mills, cotton-seed-oil mills, oil and fertilizer works, brick and tile works and wagon factories. Among the smaller industrial plants are a cotton compress, machine shops, a foundry and an ice plant. Laid out in 1894, Laurel is governed under a charter of 1901. Population in 1910, 8465. In 1920, 13,037.

Lau'rens, Henry (1724-1792), an American soldier and patriot, born in South Carolina. Though he believed that England could rightfully impose the Stamp Act and the Intolerable Acts, he was, nevertheless, prominent in the struggle against Great Britain, presiding over the Second Continental Congress for a time. In 1779 he went to Holland to negotiate a commercial treaty and was captured by the English and confined in London Tower. After 15 months he was released. He later served as one of the peace commissioners who negotiated the Treaty of Paris at the conclusion of the Revolutionary War.

Laurens, John (1753-1782), an American soldier, born in Charleston, S. C., and educated in England. Son of the patriot and statesman, Henry Laurens, he entered the army as aide to Washington, with whom he saw service in most of his great battles of the Revolution. In 1781 he was sent to France to solicit a government loan and was eminently successful. Upon his return he distinguished himself by storming a battery at Yorktown, but was killed while carelessly exposing himself in a trifling skirmish on the Combahee River. For his gallantry and patriotism, he has been called the "Bayard of the Revolution."

Laurentian, *Lo ren' shi an,* **Mountains,** a range of mountains in Canada extending northeastward from the eastern part of Ontario to Labrador. They are low mountains with rounded summits, none of which exceeds 2000 ft. The Saguenay River has cut a channel through them just north of the St. Lawrence, and capes Trinity and Eternity are among the most widely known peaks of the range. The Laurentian Mountains are the oldest land in North America. They form the watershed between the St. Lawrence and the Hudson Bay river systems.

Laurier, *Lo' ri a",* **Sir Wilfrid** (1841-1919), an eminent Canadian statesman, born at St. Lin, Quebec, the son of French Catholic parents. He was educated at L'Assomption College, and took the law course at McGill University, delivering the valedictory address for his class. Removing to Athabaska on account of his health, he opened a law office and was at the same time editor of a French newspaper. In 1871 he was elected to the Quebec Assembly. He was elected to the Dominion House of Commons in 1874, and was soon recognized as one of the most eloquent and forceful speakers in Parliament. In 1877 he entered the Liberal cabinet of Mackenzie as minister of inland revenue, retiring the next year upon the return to power of Sir John Macdonald and the Conservatives. During the next few years he opposed the Conservative high tariff, and was conspicuous in the long struggle between the Liberals and Sir John Macdonald over the territorial limits of Ontario and the constitutional rights of the provinces. In 1887 he was made leader of the Liberal Party. From the first he won great popularity among both nationalities, and showed unusual gifts of leadership. In 1896 his party came into power on a platform which called for moderate tariff revision and which opposed the restoration of Roman Catholic schools in Manitoba. Laurier became prime minister in the new government, the first French-Canadian to occupy that position since the federation of the provinces. He held the position for nearly 16 years.

The chief measures of his administration include the tariff arrangement giving preference to goods imported from Great Britain; the dispatch of Canadian troops to South Africa during the Boer War; the contract with the Grand Trunk Railway for the construction of the Grand Trunk Pacific, a second Canadian road from ocean to ocean; the appointment of a railway commission with power to regulate rates and relations between companies; the reduction of letter postage to two cents; the settlement and development of the Western territories; and a policy of commercial reciprocity with the United States.

Laurier was a strong Imperialist and a great admirer of British institutions, at the same time being an ardent Canadian, advocating colonial self-government and encouraging the new spirit of nationalism. He was a great force in overcoming antagonisms of race and creed and fusing all elements of the population into a united Canada. He cultivated friendly relations with the United States, where he was almost as popular as in his own country. In Europe, also, his qualities as statesman and orator were much appreciated. Of all the colonial representatives in England at the Queen's Jubilee in 1897 and at the Coronation of Edward VII in 1902 none was more conspicuous than he for ability and distinction of bearing, while in Paris as

in London he was recognized as one of the most eloquent speakers of our time, whether in French or in English. His ministry was defeated in 1911 on the issue of reciprocity with the United States.

Lau'rium, Mich. See CALUMET, MICH.

Laut, Agnes C. (1871-), a Canadian author, born in Ontario and educated at Manitoba University. In 1895 she became an editorial writer on the Manitoba *Free Press* and subsequently was special correspondent for the New York *Evening Post, Review of Reviews* and Montreal *Herald.* She then joined the staff of *Outing.* Among her publications are *The Lords of the North, Pathfinders of the West* and *Freebooters of the Wilderness.*

Lava, *Lah' va,* a name generally applied to rocky matter, either molten or solidified, which has been thrown out from the interior of the earth in volcanic eruptions or through fissures of solid rock. In solidified form it becomes basalt, tufa and trachyte according to the proportions of hornblende, feldspar and augite present. Some lavas cool more slowly than others and are, therefore, more porous in texture. These are often brittle and friable. Some decompose and disintegrate rapidly and fertilize the soil, while others remain unyielding for centuries. See VOLCANO.

Laval-Montmorency, *La" val'-Mong" mo" rang" see',* **François Xavier de** (1622-1708), a French Churchman, born at Laval, France. He was ordained a priest and in 1653 was made Archdeacon of Evreux. In 1658 he was made Vicar-Apostolic of New France, and entered upon his work in Canada the following year. There, in 1663, he founded the Seminary of Quebec. In 1666 he established the Church of Notre Dame, Quebec, and eight years later became the first Roman Catholic Bishop of Quebec. Laval University was named in his honor.

La"val' University, at Quebec, Canada (1852). This institution was chartered by Queen Victoria. It maintains departments of medicine, law, theology and arts, and is under the auspices of the Roman Catholic Church. It maintains a large library, and museums in which one of the most complete collections of Indian relics in America is included.

Lav'ender, a low perennial herb of the Mint Family, native in southern Europe, where it is commonly found on stony hillsides or mountains. Farther north it is cultivated in gardens for the oil, secreted by the leaves and stem. This oil has a soft, pleasing fragrance, which is retained in the dried leaves and flowers, and rendered them popular as a sachet in the linen chests of the 18th century housewife. The plant has the usual characteristics of the members of the Mint Family: square, hairy stems, narrow leaves, and two-lipped, tubular flowers growing in a spike or in whorls about the stem. The flowers are pale purple and have given the name lavender to the shade paler than lilac.

Lavender does not grow well in the United States, but in France is largely cultivated. Sea lavender, or marsh rosemary, is a member of the Leadwort Family, so named because of its spike of lavender-colored flowers. This is found growing in sea marshes along the eastern coast of the United States.

Lavoisier, *La" vwa" zya',* **Antoine Laurent** (1743-1794), a noted French chemist whose name is connected with the final overthrow of the old phlogiston theory of chemistry (See CHEMISTRY). His first works of importance were the investigation of street lighting of cities, the analysis of gypsum and experiments proving that water could not be distilled to earth. His later work was in organic chemistry, dealing principally with fermentation, putrefaction and combustion. Lavoisier was guillotined during the French Revolution.

Law, the will of the State concerning the civic conduct of those under its authority. In the nature and development of law three things stand revealed; namely, the nature, the functions and the history of government. For the existence of law there is needed in all cases

a community capable of having a will of its own and a clearly recognized body of rules to which that community has by enactment or custom given character and life. The nature of each country and state, therefore, will be reflected in its law.

Development of Law. The development of law comes from two sources, custom and religion. In the earliest times custom and religion were almost indistinguishable. A people's customs bear the likeness of their religion; thus the earliest law of Rome was little more than a body of technical religious rules.

Laws of Moses. The great Jewish historian and lawgiver Moses is considered the author of the first five books of the Old Testament, collectively called the Pentateuch. The laws herein given, with the Ten Commandments, form the basis of all moral and legal codes.

Roman and English Law. Roman law and English law are peculiar among the legal systems of western Europe for the individuality of their development. Roman law received its philosophy from Greece, and it has been said that the English common law has gone with Englishmen to the ends of the world, but both English and Roman law have been much less touched and colored by outside influence than other systems. Each has, in its turn, however, presented to the world what may be taken as a picture of the natural, the normal and untrammeled evolution of law.

Law in the Middle Ages. In the 15th century Irnerius, a famous jurist of Bologna, revised Roman law. This revision and the work of Pufendorf, an eminent German publicist, on the elements of jurisprudence, have had no small influence on the laws of the present day. Then followed Coke and Blackstone, the eminent English lawyers, who, with others, were famous as lawmakers and interpreters of the early codes. In Germanic law it was the object apparently to give effect to individual worth and liberty rather than to build a dominant community. The Teutonic hundred-moots, for example, were the popular assemblies which tried cases under the early polity of their ancestors, and the people themselves declared what law was and how it should be applied. The Scotch law has largely drawn its principles and nomenclature from Roman law.

Justinian Code. In 528 the Emperor Justinian appointed ten persons as a commission to compile a code incorporating the constitutions, rescripts and edicts. The work was finished in 14 months and it was then declared that the new code should supersede the older compilations. The code of Justinian is of great importance for law and Church history, as many edicts of the Christian emperors concerned questions of Church and State. Among the famous Roman lawgivers were Cicero, Cæsar, Pliny and Marcus Aurelius, whose rules of civil law laid the foundation for Justinian's work.

Code Napoleon. The last great codification of French law was adopted in France in the 19th century. There were five codes: namely, the *Code Civil,* published in 1804; the *Code de Procédure Civile,* published in 1806; the *Code de Commerce,* published in 1807; the *Code d' Instruction Criminelle,* published in 1808; and the *Code Pénal,* published in 1810. By way of eminence the first was called *Code Napoleon* by a law of Sept. 3, 1807. At the Restoration its name was changed back to *Code Civil* and during the time of the Second Empire it was again called *Code Napoleon.* The first book is entitled *Of Persons* and treats of civil rights, of domicile, marriages, divorce, relations of father and son, guardianship and judicial power. The second book is entitled *Of Property* and treats of ownership and the distinctions of property. The third treats of the different modes of acquiring property. Under the First Empire the adoption of the *Code Napoleon* was made obligatory on all the countries subject to the French, and in the United States it was a model for the code of Louisiana.

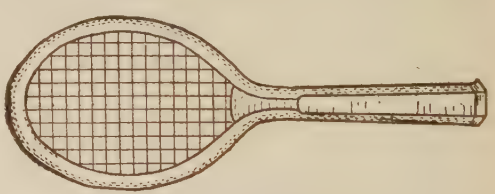
American Law. The laws of the United States rest at bottom on the same

foundation as those of England; namely, the English common law as it existed in the 17th century. New Mexico, Louisiana and the acquisitions following the Spanish-American War of 1898 are about the only exceptions worth noting. These derive most of their law from France and Spain, and thus remotely from the principles of Roman jurisprudence, but these laws have been greatly modified since coming under the United States Government. It is the right of each state, however, to regulate at its pleasure the general relations of persons within its territory to each other, as well as all rights to property subject to its jurisdiction. The trial courts follow in general the practice of the state in which they sit, as to procedure in cases of common-law character. The public statutes of the United States are to be found in the *Revised Statutes of 1873* and in the *Statutes at Large* enacted by each Congress. Municipal subdivisions of a state generally have authority from the Legislature to make by-laws or ordinances on subjects having the character of a local law, with appropriate sanctions, commonly by fine or forfeiture. Law in the United States is constantly being changed by legislation to meet new phases of state government, and upon the character of the state government depends the character of the nation as a whole.

Law, Andrew Bonar (1858-), an English statesman, born in New Brunswick, Canada. He was educated in Hamilton, Ontario, and in Glasgow, and later became a member of a firm of iron merchants in Glasgow. In 1900 he entered Parliament, and from 1902 to 1906 was Parliamentary secretary of the Board of Trade. Although Mr. Law has never held a cabinet position, he displayed such ability on financial questions and such qualities of leadership that he was chosen to succeed Arthur Balfour in 1910, when the latter resigned as head of the Conservatives in the House of Commons.

Lawn Mower, a machine employed for cutting short grass in parks and on lawns, but not adaptable for cutting tall grass. It consists of two small wheels, to which are geared swiftly revolving spiral knives bearing against a dull edge, so arranged that when the machine is pushed against the grass, the knives cut it. The lawn mower is usually operated by man power, and is provided with a long handle, at the end of which is a crosspiece to guide the machine.

Lawn Tennis, a game originated in England and since about 1874 increasingly popular throughout Europe, the United States and Australia. It is played with one ball at a time by two, three or four persons, each with a racket, on a smooth and well-rolled, clay or grass court, which should measure 78 ft. in length and 36 ft. in width, and must be clearly marked out by white lines. Between posts which stand 3 ft. outside the court, a net is stretched across the center perpendicular to the side lines. This should be 3½ ft. high at the posts and 3 ft. high at the center. Two lines



LAWN TENNIS RACKET

drawn lengthwise across the court 4½ ft. from the side lines narrow the court to 27 ft., the width to be considered when only two play, or to be covered by one who plays against two individuals or partners. These, with two 27-foot lines drawn parallel to the net, but 21 ft. from it, mark the limits of the service courts, which are divided by a line through the center, perpendicular to the net. Hence there is on each side of the net a right and left service court.

Tennis balls are of rubber, inflated and tightly covered with white flannel, and weigh about two ounces. The racket has a frame of light wood; its face, not counting the handle, measures 8 by 15 inches, and is tightly strung with gut. Rules vary from time to time; in general, the game runs about as follows:

A ball is *served* from behind the court, over the net, to the player defending the opposite right-hand court. If this falls in the service court, and is not returned, the server scores one point, or 15. If successful in serving to the other court his score becomes 30; then 40, and one more point gives him the game. If the first ball served goes under or into the net or does not fall within the proper service court, the server has a second trial. If again unsuccessful, he loses the point. He loses, also, whenever the ball is returned directly, or after not more than one bound, into any part of his court, once or repeatedly, and he fails to drive it back again. When the score is tied at 40, it becomes a *deuce* game, and the side which first wins two points in succession scores the game. A set is scored for the player or team which first wins a total of six games. Contests are usually for two out of three sets, or for three out of five. When five games have been won by each side, the set is a *deuce* set, and can be won only by securing two games in succession.

Law'rence, James (1781-1813), an American naval officer, born at Burlington, N. J. He entered the United States navy as midshipman in 1793, soon became a lieutenant and distinguished himself in the Tripolitan War, being second in command when Decatur burned the *Philadelphia*. Having been first lieutenant on the *Constitution* and having commanded the *Argus, Vixen* and *Wasp,* he was made captain and commander of the *Hornet* in 1811. He cruised with Bainbridge's squadron in the War of 1812, capturing the British brig-of-war *Peacock* on Feb. 24, 1813, for which he was given a gold medal and command of the *Chesapeake*. A few days after having assumed command, June 1, 1813, he attacked the British ship *Shannon,* off Boston. After 15 minutes of bloody fighting the *Chesapeake* was captured and with Lawrence was taken to Halifax, Lawrence dying on the way. During the battle, when being carried below, he had cried, "Don't give up the ship." These words became a slogan in the navy.

Lawrence, Kan., a city and the county seat of Douglas Co., about 40 m. s.w. of Kansas City on both banks of the Kansas River, and on the Union Pacific and the Atchison, Topeka & Santa Fe railroads. The city has important commercial and manufacturing interests. Lawrence has the only water power on the Kansas River, which largely promotes the city's manufactures. Among the industrial plants are flour mills, machine shops, foundries, vitrified-brick and tile works, a creamery and manufactories of collars, shirts, paper, outing clothing, fireless cookers, ice and sash, blinds and doors. There are also wholesale seed houses.

Lawrence contains about nine miles of street electric railway. There are three fine parks. Lawrence is largely a city of homes. There are a number of notable public buildings, including a courthouse, Federal Building, a Carnegie library, Y. M. C. A. Building and one of the finest small theaters in the West. There are about 24 churches. Lawrence is the seat of the Kansas State University, and of Haskell Institute, a government school for Indians. Lawrence was named in honor of Amos A. Lawrence. The place was first settled in 1854 by an anti-slavery colony from the East, and was the first of the "free state" towns founded by the Emigrant Aid Society immediately after the passage of the Kansas-Nebraska Bill. For several years it was the headquarters of the Anti-Slavery Party in Kansas. It suffered from several attacks of pro-slavery agitators. Population in 1920, U. S. census, 12,456.

Lawrence, Mass., a city and one of the county seats of Essex Co., 9 m. n.e. of Lowell and 26 m. n.w. of Boston, on both sides of the Merrimac River and on several branches of the Boston & Maine Railroad. The villages of Carltonville, Hallsville and Arlington District are contained within the corporate limits of the city. Electric railways connect with Boston, Andover, Lowell, Haverhill and Salem, Mass., and Salem and Nashua, N. H. The site of the city is

especially adapted to the building up of an important industrial center. The Merrimac divides the place into two nearly equal sections and at this point has a descent of 28 ft. in half a mile, affording immense water power by means of a dam across the rapids, and canals on each side of the river.

The city has broad and well-shaded streets, fine parks and a number of notable buildings, which include the Essex County Training School, Children's Home, Lawrence and Cottage hospitals and an endowed home for aged people. There is also a public library and a Federal Building.

Lawrence has been given the title of the "Worsted City," as it produces more worsted and woolen dress goods than any other city in New England. There are also extensive manufactories of paper and paper-mill machinery, doors, sash and blinds, engines, boilers, beltings, sewing machines, carriages, hardware, boots and shoes, calico, duck and shirtings. The territory now included within the city limits was, previous to 1845, included within portions of two old historic towns, Methuen and Andover. In 1846 an associated company of financiers, merchants and manufacturers procured an act of incorporation under the name of the Essex Company, which was chartered for the purpose of developing the water power and establishing factories. Lawrence was named in honor of the eminent merchant manufacturers, Abbott and Amos Lawrence, who were deeply interested in its establishment and success. Lawrence was chartered as a city in May, 1853. Population in 1920, U. S. census, 94,270.

Law'ton, Henry Ware (1843-1899), an American soldier, born in Ohio. At the beginning of the Civil War he became sergeant of the Ninth Indiana Infantry, and in 1865 was brevetted colonel. The following year he was commissioned second lieutenant in the United States infantry, and by 1889 was lieutenant-colonel. During the Spanish-American War, as brigadier-general of volunteers, he commanded at the capture of El Caney, July, 1898. The following year, as second in command in the Philippines, he was efficient against the insurgents until killed during the attack on San Mateo.

Lawton, Okla., a city and the county seat of Comanche Co., about 75 m. s.w. of Oklahoma City near the Cache Creek, and on the St. Louis & San Francisco, the Chicago, Rock Island & Pacific and other railroads. In 1901 the Comanche Reservation, a tract of land in the southwestern part of what was then Oklahoma Territory and which was somewhat larger than the State of Connecticut, was divided into three parts, forming the counties Comanche, Caddo and Kiowa. The site of the present city of Lawton was selected for the county seat, and by the day of opening, 25,000 settlers were camped just outside the town limits ready to enter claims. The place was named for Gen. Henry W. Lawton. The city is administered under the commission form of government. Population in 1920, U. S. Census, 8,930.

Lay'ard, Sir Austen Henry (1817-1894), an English archæologist and diplomat, born at Paris, France. His life until he was 16 years of age was passed mainly in Italy. From there he went to London and studied law. In 1839 he traveled and became interested in the site of ancient Nineveh, where he made excavations in 1845-1847, securing valuable relics which he sent to the British Museum. He recorded the results of his research in this field in his books, *Nineveh and Its Remains* and *Monuments of Nineveh*. During the latter part of his life he filled several important diplomatic positions, was honored by Oxford and was granted the Order of the Bath.

Laz'arists, or Society of Priests of the Mission, a distinguished order of the Roman Catholic Church founded in 1624 by St. Vincent de Paul. St. Vincent, who came from a humble family, was ordained a priest in 1600. Later he was captured by the Moors and taken as a slave to Tunis. Here he finally became the property of a renegade from

Nice whom he reconverted and induced to flee with him to France. On his return to France, St. Vincent began his work of alleviating the condition of the poor, and founded the Lazarists, who take their name from the Priory of St. Lazaire, where they were first established. The aim of the order is to assist parish priests, to give retreats and missions for clergy and laity and to conduct schools, especially seminaries. With the help of the order, St. Vincent founded the first hospital for foundlings in France, the first asylum for destitute aged, and the first school and home for idiots and the feeble-minded. He also founded the Daughters of Charity, whose work is among the poor. From France the Lazarists spread throughout the Christian world and into pagan lands.

Lead, *Led,* one of the earliest-known metals, found chiefly in connection with sulphur in the mineral known as galenite. It is a soft, blue-white metal, when pure having a bright luster, but easily oxidized. In the presence of air and pure water, lead hydroxide is formed, which is poisonous and generally soluble in water; if the water contains any salts of carbon or sulphur, the lead is coated with insoluble carbonates and sulphates, which thus render lead pipes safe conductors of water. Since most waters contain these salts, lead is commonly used for water pipes, because of its malleability. Its chief use is in the manufacture of white lead, a pigment extensively used in painting (See WHITE LEAD). With tin it is used to make soft solder, and with antimony to make a hard type metal and also lead bullets. The chief sources of lead in the United States are Missouri, Kansas, Montana and Idaho. At present the United States leads the world in its production.

Lead (for sounding), a leaden bar shaped somewhat like a clock weight, used by sailors to ascertain the depth of the sea. Those for use in shallow waters weigh from 5 to 14 lb., but there are other sizes up to perhaps 120 lb. The lead is lowered by a lead line of strength proportionate to the weight. Knots of different size or pieces of colored cloth indicate the length of different sections, so that the depth of the water in which soundings are made can be quickly determined. A cup-shaped recess in the bottom or larger end of the lead contains the arming, usually of tallow. To this, sand, gravel, clay or silt adheres after the lead has rested upon the ocean floor, and thus the character of the sea bottom is ascertained. For deep-sea soundings special forms of apparatus are required. See SOUNDING.

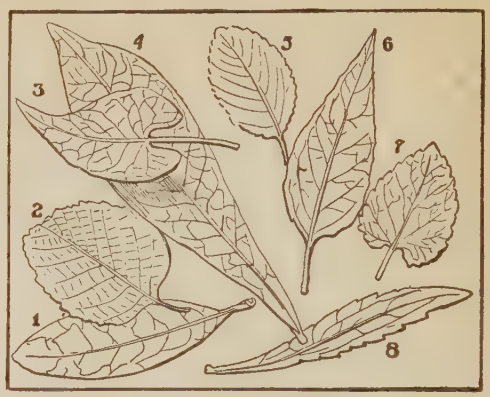
Lead, *Leed,* **S. D.,** a city and county seat of Lawrence Co., 4 m. s.w. of Deadwood, about 18 m. from the western boundary of the state, on the Chicago & North Western, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul and other railroads. The city is situated in the Black Hills and is the home of the famous Homestake mine, with one of the largest mining plants in the world. The annual production of gold from the Homestake and other mines in and around Lead amounts to $8,000,000. There are also machine shops, mining-tool works, gold-jewelry factories and a number of large cyanide mills. The city is thoroughly modern, and contains a hospital, Hearst Free Library, a recreation hall and fine municipal buildings. It is the seat of a Catholic see. Population in 1920, 5,013.

Lead Poisoning, a disease due to the presence of a large amount of lead in the system. Lead is often found in water which has stood for some time in lead pipes. It is an ingredient of some candies and a constituent of many hair dyes and face powders. Disturbances resulting from lead poisoning are accompanied by pallor and rheumatism. In severe cases paralysis and delirium, and sometimes convulsions, are symptoms, and death has been known to result. Opium is the drug most commonly used for allaying the pain and relieving the constipated condition which the poisoning causes, though cathartics alone are frequently employed. The classes most commonly poisoned with lead are painters and lead-factory employees.

Leadville, *Led' vil,* Colo., a city and the county seat of Lake Co., 78 m. s.w. of Denver, on the Denver & Rio Grande, the Colorado Midland, the Colorado & Southern and other railroads. It is situated on a terrace of the Mosquito Range at the head of the Arkansas River. In the immediate vicinity are Mt. Massive (14,424 ft.), the highest peak in the state, and Elbert Peak (14,421 ft.). At the foot of the former mountain there is a United States fish hatchery. Leadville is famous for its mineral wealth. Gold was discovered here in 1860 and a settlement, known as California Gulch, sprang up. The post office was known as Oro City. After a rich but brief gold production the city declined in population. About 1877 rich deposits of lead were found, and by 1879 a city of 35,000 inhabitants had developed. The value of the mining output for the next ten years was $147,834,186. More gold was discovered in 1892, and in the 20 years preceding 1900 the yield of the camp was $250,000,000. Leadville is a prominent producer of lead, silver and zinc. It is one of the few sources of bismuth in this country. The city contains large smelting furnaces and sampling, refining and reduction works. There are hospitals, a Federal Building and theaters. Population in 1920, 4,959.

Leaf, *Leef,* the vegetative and respiratory organ of a plant. By means of it the plant receives gases and moisture from the air and transforms them into food. It is a curious fact that green plants take up carbon dioxide and give off oxygen by means of their leaves, and at the time also breathe in oxygen and give off carbon dioxide. Plants like animals must breathe in order to live.

Leaves may be scale leaves, bracts, foliage leaves or floral leaves. Scale leaves and bracts do not aid in assimilating the food, but serve as protection, mainly to the bud. The perfect foliage leaf consists of three parts: the leaf blade; the stalk, or petiole; and the stipules, or wings, which are generally at the base of the petiole. This form allows the leaf to present the greatest possible surface to air and sunlight. In some plants, however, as pines, the leaves lack the differentiation into blade and petiole. Leaves that lack the petiole are said to be sessile. Sessile leaves may clasp the stem or entirely surround it.



TYPICAL LEAVES

1. Elliptical.
2. Orbicular.
3. Sagittate.
4. Oblanceolate.
5. Oval.
6. Obovate.
7. Ovate.
8. Lanceolate

Leaves are classified according to their veining as parallel-veined or net-veined. A leaf of the first class has its veins running parallel to each other, either from the base to the apex or from the midrib to the margin without any interlacing veins. Net-veined leaves have their veins branching into a network of fine veinlets. Net-veined leaves are pinnately or palmately veined according to whether the veins spring, featherlike, from the midrib, or spread from the base like fingers from the palm of the hand. The general shapes of the leaves and the names applied to each are shown in the accompanying cut. The margins are described as entire, serrate, dentate, scalloped, wavy, sinuate, incised or lobed, according to the way in which they are cut. See STUDY GUIDES, article *Botany.*

Leaf Insect, an interesting but rarely-known insect of the Walkingstick Family, found in warm regions. It is little known, however, because, with its green platelike body, its flattened wings and legs, and the dashes of yellow that spot it irregularly, it closely resembles

the leaves flecked with sunshine, upon which it habitually feeds. This mimicry is its only means of defense. See MIMICRY; WALKINGSTICK.

League of Nations, a voluntary union of a number of the more advanced nations to promote the peace of the world by a tribunal to settle international disputes. The details of the organization of the league form a part of the Treaty of Versailles. It is evident that to be efficient such a league must command the respect of the world by reason of the number and character of the nations composing it, and able to bring pressure of a moral, economical or political nature to enforce its decisions which must be in accord with the highest principles of international law. The present league is at least an attempt to take a forward step in international relations, perhaps the greatest ever taken. The future only will determine the degree of success attained. (See "World War" in STUDY GUIDES; subhead *Covenant of the League of Nations.*)

Leap Year, every fourth year in which the intercalary, or extra, day is added to February to correct the Gregorian Calendar. It is so called because it leaps forward one day. It was called by the Romans *bissextile,* because they counted the sixth day before the calends of March twice (bis), instead of adding a day to February, giving it 29 days each fourth year instead of its regular number 28. See CALENDAR.

Lease, *Lees,* an agreement by virtue of which one party occupies lands or buildings, or both, belonging to the other party during the term agreed upon in the contract. The party owning the lands is known as the lessor, and the party leasing them as the lessee. The consideration paid by the lessee is known as rent. The lease specifies the length of time that the contract is in force, the amount of rent and the times of payment, and it may state the rights and privileges of the parties.

Leather, the dressed skins of animals prepared by tanning, tawing or chamoising, so as to give them greater strength and toughness and to stop their tendency to decay. There are three methods of preparing leather: first, by treating with tannic acid, as contained in tanbark or other vegetable compounds, called tanning; second, by treating with alum, bichromate of potash or other salts, called tawing; and third, by treating and filling with oils, called chamoising. Tanning is the process ordinarily employed, and, although all kinds of skin can be tanned, the ones most generally prepared by this process are those of the larger animals. Those of cattle and horses, when tanned, take the name of hide, as cowhide and horsehide, while those of the sheep, calf and dog are known respectively as sheepskin, calfskin and dogskin.

TANNING. The first part of the process of tanning begins by softening the hide in water, sometimes heating it slowly or adding salt or carbolic acid, or in machines which subject the skins to a kneading process. The hair is generally removed by the use of lime, the ordinary method being to place the hides in a tank containing a solution of lime, known as milk of lime, and leaving them exposed to the air. The removal of the hair is further hastened by scraping the hides by hand or by machinery.

After the skins are thoroughly cleaned and scraped to remove all traces of lime, hair, flesh and other matter, they are suspended in vats or tanks containing the tanning solution, which is usually made by soaking ground oak or hemlock bark in hot water. The skins are turned and removed successively from one vat or pit to another, each succeeding vat containing a stronger solution than the preceding one. This gradation is necessary so as not to make hard or brittle leather. In making sole leather, the hide should remain in the last pit for five or six weeks; after it is taken out it is beaten to harden it, then oiled and afterwards rolled to give it a smooth, finished appearance.

TAWING. Tawing is the process used in the preparation of sheepskins and goatskins for making leather for gloves

and the uppers of ladies' shoes, and consists either of dressing the skins in antiseptic materials, in order to preserve them from decay, or treating them with salts, which fasten upon the fiber and prevent the skins from drying and becoming hard. After the skins have been softened and limed, as in tanning, they are put into a mixture of bran and water; from this they are put into a bath consisting of alum and salt. After remaining in this bath and being thoroughly treated for five minutes, they are "pasted;" that is, filled with a paste consisting of wheaten bran or flour mixed with the yolk of eggs. After the skins have been dried, they are dipped in pure water and worked or "staked" by pulling them to and fro on a stretching iron. Afterwards they are aged for several months and prepared for finishing. The skins are now washed to remove all particles of alum and salt, and are then re-egged in order to give them the proper body. Finally the skins are dyed.

CHAMOISING, or SHAMOYING. Chamoising consists in treating the skin with oil. After a lime treatment and a bran drench to remove the lime have been applied, the skins, while still wet, are oiled with fish, seal or whale oil, to which a small quantity of carbolic acid has been added. The oil is worked into the skin, making its texture spongy and soft. Chamois leather is so prepared principally from the split sheepskin.

KINDS OF LEATHER. Sole leather is made from the thick parts of cowhide and horsehide, while shoe uppers are made from the thin portions of these hides and from the skins of smaller animals, such as the calf, sheep and goat. Various grades of kid and the so-called morocco, formerly an article of import from the Barbary coast, are made from goatskins. Alligator leather, frogskins, snakeskins and kangaroo are made from the animals whose name they bear. Russia leather is valued for the aromatic odor given it from the oil of birch bark, which is used in tanning. A waterproof leather made of horsehide is called Cordovan, which originated in Cordova, Spain. Enameled, or patent, leather is made by treating the tanned skins with several coatings of lampblack and oil; when dried it is rubbed with pumice stone, varnished and baked.

The United States makes leather to the value of over $500,000,000 per year. A large number of the skins are imported, principally from Australia and from Argentina and other South American countries. See BOOTS AND SHOES; GLOVE.

Leatherback Turtle, one of the largest turtles, a member of the Chelonid Family. It is remarkable in having a leathery, angled armor in place of the horny shell common to the class. It is a great rover and, although it commonly breeds in the West Indies, it is found upon the coasts of the New England States, England and France. Its length is sometimes as great as eight feet and its weight is 1000 pounds.

Leatherwood, a graceful, Northern shrub of the Mezereum Family, found generally in thick, damp woods and upon wooded hillsides. It is a beautiful shrub when young, for then its bark has fine, light green lines running vertically along the stem; as the tree grows older these lines disappear. The bark is so tough and fibrous that it was used by the Indians in making thongs and is still often put to like uses by hunters and woodsmen. The leaves are oval in shape and smooth. The flowers are yellow, with four small lobes not flatly spread; they grow in loose clusters and bloom before the leaves appear in the spring. The fruit is a red berry used in medicine as an emetic.

Leavenworth, *Lev' en wurth,* **Kan.,** a city and the county seat of Leavenworth Co., 26 m. n.w. of Kansas City on the Missouri River, which is here crossed by two railway and highway bridges. The railroads entering the city are the Missouri Pacific, the Atchison, Topeka & Santa Fe, the Union Pacific, the Chicago, Rock Island & Pacific, the Chicago, Great Western, the Chicago, Burlington & Quincy and the Leavenworth & To-

peka. Leavenworth is one of the most important railway centers west of the Missouri River, and is of considerable commercial prominence. Coal mining is an important industry. The principal manufactures include mining and mill machinery, stoves, furniture, wagons, vitrified and building brick and flour.

Leavenworth has a number of noteworthy buildings, among them a Federal Building and a courthouse. Among the prominent institutions are the Kansas State Orphan Asylum, Cushing and St. John's hospitals, a state normal school, Mount St. Mary's Academy and the Whittier Library. The National Soldiers' Home in the suburbs of the city is built to accommodate 4000 inmates. A prominent feature of the city is a statue of Gen. U. S. Grant. The city is the seat of a Roman Catholic bishopric and has a fine cathedral. Here are located a Federal prison and also a state penitentiary. Near the city is Ft. Leavenworth, one of the most important United States military posts of the West. A National cemetery is located in the vicinity. Leavenworth takes its name from the fort built on the site in 1827 by Col. Henry Leavenworth, and is the oldest permanent settlement in Kansas. It was chartered as a city in 1855, and during the Civil War was a center of pro-slavery sentiment. It is now operating under the commission form of government. Population in 1920, 16,901.

Leb'anon, Pa., county seat of Lebanon Co., 26 m. e. of Harrisburg and 28 m. w. of Reading, on the Philadelphia & Reading, the Cornwall & Reading and other railroads. It is situated in the Lebanon Valley, between the Blue and South mountains, not far from the noted Cornwall iron mines. The principal industries are iron mining, brickmaking and quarrying, and there are manufactories of machinery, silk, chains, stoves, boilers, bolts and nuts, organs, cigars and other articles. The iron, chain and furnace works and rolling mills are extensive, and the nut and bolt plant ranks among the largest in the world. Lebanon was settled as early as 1700 by German immigrants. The borough was laid out by George Steitz in 1750 and was first called Steitztown. It was incorporated in 1820 and chartered as a city in 1885. There are several educational institutions, including the Lebanon Business College and School of Telegraphy. Population in 1920, 24,643.

Lebanon Mountains, a mountain range of Syria often mentioned in the Old Testament. It extends parallel to the Mediterranean coast not far from the sea, and stretches for about 100 m. n. from the mouth of the Litany, or Leontes, River. The height of the range averages about 6500 ft. Being mostly of limestone formation, the mountains have been cut in deep gorges and ravines. The eastern slopes are barren but the western are covered with groves of mulberries, olives and figs, vineyards and fields of grain. The great cedar forests so often mentioned by ancient writers have been almost wholly destroyed, scarcely 100 trees remaining. See PALESTINE.

Lebrun', Charles (1619-1690), a French painter of historical subjects. After four years' study in Rome he returned to France and executed numerous works for Louis XIV and high officials of his court; and in 1662 he became first painter to the King. His style was grandiloquent and in keeping with the prevailing ideas of the French court. He was a prolific worker and is one of the most representative figures of the Classical School.

Lebrun, Marie Louise Elizabeth Vigée (1755-1842), a French portrait painter of eminence. She had established a reputation in her art by the time she was 15 years of age, and was elected a member of the French Academy as soon as she had reached the age limit. In 1779 she became painter in ordinary to Marie Antoinette and at once began a series of portraits of her royal patroness. She was a woman of charming social graces, and in her wide travels was everywhere enthusiastically received. Her figures, though conventional, show a refinement of taste and carefulness

of execution that render them worthy of high praise. Among her well-known portraits are those of herself and daughter, the Prince of Wales (George IV), Lord Byron and Marie Antoinette and her three children.

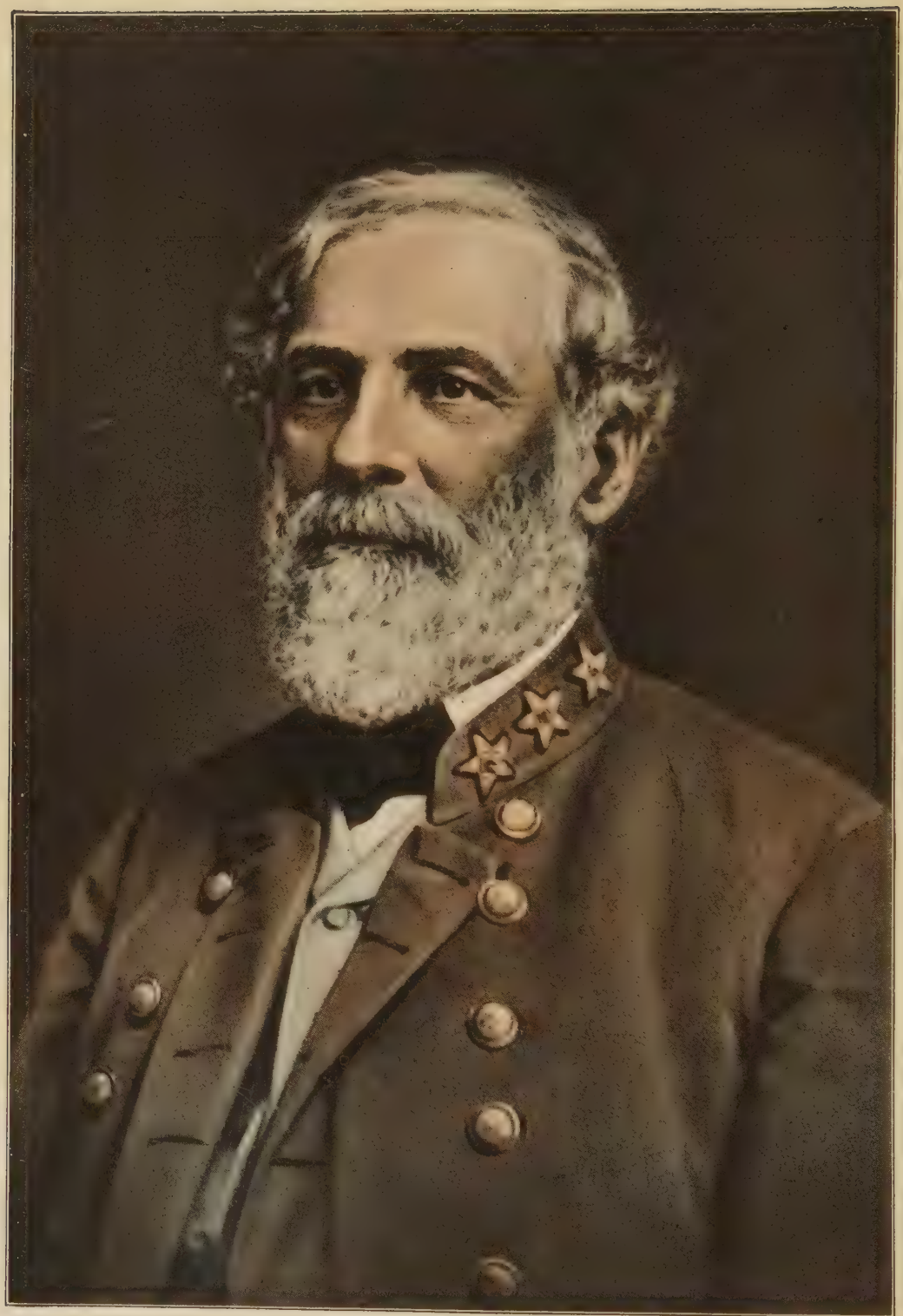
Leck'y, William Edward Hartpole (1838-1903), an English historian, born near Dublin, Ireland. He graduated at Trinity College, and his first work, *The Leaders of Public Opinion in Ireland,* was published anonymously in 1861. His later writings revealed the acute thinking of a contemplative mind, a judicial impartiality, in the main, and a clear and lucid style. He represented Dublin in Parliament, being elected in 1895 and again in 1900. Various university honors were bestowed upon him by Dublin, Glasgow, Oxford and Cambridge; he became a privy councilor in 1897 and an original member of the new Order of Merit in 1902. His works include *History of the Rise and Influence of the Spirit of Rationalism in Europe, History of European Morals from Augustus to Charlemagne, History of England in the Eighteenth Century, The Political Value of History, Democracy and Liberty* and *The French Revolution.*

Le Conte, *Le Kont',* **Joseph** (1823-1901), an American geologist, born and educated in Georgia. He was the son of Lewis Le Conte, the naturalist. After graduating from the College of Physicians and Surgeons in New York, he began the practice of medicine at Macon, Ga. Following a trip to Florida with Louis Agassiz, he held professorships in Oglethorpe University, Franklin College and the University of South Carolina; and, from 1869 until his death, in the University of California. His pleasing style made his writings attractive and widely useful. These include *Elements of Geology, Compend of Geology* and *Evolution: Its Nature, Its Evidences, and Its Relation to Religious Thought.*

Lee, Arthur (1740-1792), an American diplomat, a member of the famous Lee family of Virginia, born at Stratford, Va. He studied medicine and law in England and was admitted to the bar in London and secured a lucrative practice there. In 1770 he was appointed by Massachusetts to act with Franklin as agent of that colony in London. From 1775 to 1779 he served with Franklin and others in France and Spain in behalf of the colonies, one result of their efforts being the treaty of alliance with France. Returning to America in 1780, he served in the Legislature of Virginia and in the Continental Congress; was a member of a commission to make treaties with the Indians of the Northwest; and acted on the "Board of Treasury" which managed the desperate financial affairs of the confederation of states before the adoption of the Constitution.

Lee, Charles (1731-1782), an American general of the Revolution, born in England, the son of a British officer. He fought with Braddock in 1755 in the last French and Indian War. At the outbreak of the Revolution, he offered his services to the colonies for a major-generalship and $30,000. He took part in the siege of Boston, commanded in New York and was unjustly given credit for the victory at Ft. Moultrie. He was captured by a band of British dragoons, but was later exchanged for Prescott, and commanded the advance wing at Monmouth. Here his insubordination led to a public reprimand by Washington, and to his court-martial and suspension from command for a year. He was discharged before the end of the war, and returned to his plantation in the Shenandoah Valley.

Lee, Fitzhugh (1835-1905), an American soldier, born in Clermont, Va., and educated at West Point. When the Civil War broke out he identified himself with the cause of his native state, and before the close of the war became a major-general in the Confederate army. He served as governor of Virginia from 1886 to 1890, and in 1896 was appointed consul-general at Havana. Here he remained until the outbreak of the war with Spain, when he returned and entered the United States army as major-general of volunteers. After the war he served as military governor of Ha-



GENERAL ROBERT E. LEE

LEE

vana, and was later made brigadier-general in the regular army.

Lee, Henry (1756-1818), an American Revolutionary soldier, popularly called "Light Horse Harry," born at Leesylvania, Va., and educated at Princeton. He joined Washington's army just before the Battle of Brandywine, and in 1778, as major, was put in command of several irregular detachments. He was the hero of the brilliant surprise of Paulus Hook, N. J., in 1779, and the following year become lieutenant-colonel. Lee served with great distinction at Guilford Courthouse, Camden and Eutaw Springs, and his cavalry constituted Greene's rear guard, the post of greatest danger and responsibility during that general's famous retreat before the British under Cornwallis. After the war, from 1786 to 1788, he was sent to Congress as a delegate from Virginia and advocated the adoption of the Federal Constitution. From 1792 to 1795 he was governor of his state, and, having again served, from 1799 to 1801, in Congress, he retired from public life.

Lee, Richard Henry (1732-1794), an American Revolutionary patriot, brother of Arthur Lee and Francis L. Lee, born at Stratford, Va., and educated in England. He returned to Virginia in 1752, where he inherited an estate from his father. In 1757 he was elected to the House of Burgesses, where he took a leading part in resisting the unjust claims of England. He was one of the originators of the Committee of Correspondence which led to the calling of the First Continental Congress in 1774, of which he became an influential member. On June 7, 1776, he made the motion that "these colonies are, and of right ought to be, free and independent states," which was carried July 2. He was a member of the Congress authorized by the Articles of Confederation, and, although opposed to the Federal Constitution, became senator from Virginia under the new regime and warmly supported the administration of Washington. He retired from public life in 1792. Lee was a powerful orator.

Lee, Robert Edward (1807-1870), a distinguished American general, commander-in-chief of the Confederate army in the Civil War. He belonged to the famous Lee family of Virginia which furnished two signers of the Declaration of Independence and two representatives of the American colonies abroad. The son of "Light Horse Harry" Lee, the dashing cavalry leader of Revolutionary fame, Robert was born in Westmoreland county, Va., Jan. 19, 1807. Observant and studious as a boy, he received his early education in a private academy at Alexandria. At the age of 18 his inherited military instincts asserted themselves and he secured appointment to a cadetship at the West Point Military Academy. Here he graduated in 1829, second in a class of 46, and from this time until 1834 was in the engineer corps with the rank of second lieutenant. In 1831 he married Mary Randolph Custis, granddaughter of Martha Washington, from whom he inherited the Arlington estates on the Potomac.

In 1834 he became assistant to the chief engineer at Washington, and later took charge of the defenses in New York Harbor, where the outbreak of the Mexican War found him in 1846, with the rank of captain. His brilliant services during this war won for him the brevet rank of colonel, and Gen. Winfield Scott predicted that "if opportunity offered, he would show himself the foremost captain of his time." From 1852 to 1855 he was superintendent of West Point, where he introduced important improvements in discipline and curriculum. He was then appointed lieutenant-colonel of a new cavalry regiment which he accompanied to Texas. While home on a furlough in 1859, he commanded the Virginia forces that defeated and captured John Brown at Harper's Ferry. In 1861 he became colonel of his regiment.

When war between the North and the South became certain, Lincoln offered Lee the command of the army of the United States; but he answered, "Though opposed to secession and dep-

recating war, I can take no part in an invasion of the Southern States." He then resigned his commission and cast in his lot with his native state and the South. First as major-general of the Virginia troops, then as brigadier-general in the Confederate army, and later as commander-in-chief of all the Southern forces, he thenceforth devoted his splendid abilities throughout the war to the cause he had so conscientiously espoused.

After a brief command in Virginia in 1861 and work on the coast defenses of South Carolina and Georgia, he became military adviser of President Davis and demonstrated his great powers of organization. In June he was placed in command of the Army of Northern Virginia and checked McClellan's advance towards Richmond in the Seven Days' Battle, June 25 to July 1, forcing the Federal army to retreat. He then turned upon Pope and, with the aid of "Stonewall" Jackson, defeated him in preliminary engagements and at the second Battle of Bull Run, Aug. 30. After this he crossed the Potomac into Maryland to threaten Washington, but a series of checks, culminating in the drawn battle of Antietam (Sept. 16 and 17, 1862), forced him to retreat beyond the Rappahannock. Lee and his troops had fought with great skill and bravery, causing the Federal army the loss of Harper's Ferry with 11,000 men and all its stores. The plan of the Union army to advance again upon Richmond was thwarted by Lee's defeat of Burnside at Fredericksburg (Dec. 13, 1862) and of Hooker at Chancellorsville (May 2-4, 1863). But his subsequent invasion of Pennsylvania failed, and he was forced to retreat to Virginia after the Battle of Gettysburg, July 1, 2 and 3.

In the spring of 1864 the campaign opened with the advance of General Grant and a force of 120,000 men, determined to take Richmond. To oppose this splendid army Lee had only about 60,000 men, poorly armed and equipped; yet such was his skill and resource that for a whole year of almost continuous fighting he held the prize from the enemy's grasp in the face of these tremendous odds. But Grant finally broke through the defenses about the city, and on Apr. 2, 1865, Lee evacuated Petersburg and Richmond. The superior numbers of the Federal army prevented a conjunction with the forces of Johnston, and Lee surrendered his gallant army to Grant at Appomattox Courthouse on Apr. 9. When he rode into Richmond after the surrender, he received a remarkable ovation from the Federal troops, in acknowledgment of his ability and courage.

Lee accepted the outcome of the war in good faith and retired to private life. Refusing many lucrative offers, he accepted the presidency of what is now Washington and Lee University at Lexington, Va. Here he continued to serve with self-sacrificing ability for nearly five years; but the exposures and responsibilities which he had borne affected his health, and he died on Oct. 12, 1870.

Physically, intellectually and morally Lee was a large and symmetrical man. He was modest, vigorous, keen and self-possessed. Pure and upright in character, in manner he was simple, dignified and courteous. His ruling characteristic was an inflexible devotion to duty as he saw it. Denied the reward of victory for his cause, he retained the consciousness of having done his best, and received the idolizing affection of his army and the South. "He was a foe without hate, a friend without treachery, a soldier without cruelty and a victim without murmuring."

Leech, a group of families of the class Appendiculata. There are both fresh-water and marine species, and one genus inhabits the moist grass of tropical regions. They have segmented bodies like the earthworm but the segments are without bristles; they move by means of suckerlike openings at each extremity of the body. There are from two to ten pairs of eyes, but the other sense organs are poorly developed, as are also the digestive and nervous systems. They reproduce by means of eggs left in cocoons attached to submerged plants.

Leeches are frequently known as bloodsuckers from their habit of attaching themselves to the bodies of animals, especially fish and cattle, piercing their flesh by means of three sharp, radiating saws, and sucking the blood. When satisfied they release their hold and lie at rest for a long period, sometimes two or three months, digesting their food. The horseleech is said to need but one full meal a year. The medicinal leech was widely used in European countries during the 15th and 16th centuries to draw blood from a person suffering from almost any disease; from this practice, the physician was also commonly known as a leech.

Leeds, a town in West Riding, Yorkshire, England, situated on the River Aire, 21 m. s.w. of York. It is one of the principal manufacturing towns of England and ranks fifth in point of population. The surrounding district is rich in coal and iron deposits and is also favorable for agriculture and grazing purposes. Among the prominent buildings are the Church of St. John's, the Church of St. Peter's, the town hall, the Kirkstall Abbey, Adel Church and the Yorkshire College. It is the center of the British woolen trade, and contains important manufactories of drugget, felt carpeting, machinery, implements, decorative earthenware, chemicals, shoes and paper. Population in 1911, 445,568.

Leek, a plant of the Lily Family related to the onion but having a stronger flavor. It grows wild in the United States, but is planted in the gardens of southern Europe and is used there much as the onion is in America. The root bears a scaly bulb, from which a flat, leafy stem arises, sometimes to a height of two feet. The leaves are long and flat and sheathe the stem; at the summit of the stem is a close cluster of small white flowers, which bloom in July. The leek is native in Switzerland.

Lefebvre, *Le fev' r',* **Jules Joseph** (1836-1912), a French portrait painter, a pupil of Léon Cogniet. His *Death of Priam* won for him the Prize of Rome and in 1878 a medal of the first class was awarded him by the Universal Exposition in Paris. In the field of portraiture he was preeminent, though he handled other subjects, as indicated by the following titles: *Sleeping Maiden, Nymph with the Infant Bacchus* and *A Daughter of Eve.*

Le Gallienne, *Le Gal" i en',* **Richard** (1866-), an English poet and critic, born in Liverpool. He turned from a business career to literature, and in 1899 published criticisms on the style and art of Rudyard Kipling. After lecturing in Canada and the United States, he took up his residence in New York City. Among his works are *Volumes in Folio, Sleeping Beauty and Other Prose Fancies, The Religion of a Literary Man* and a paraphrase of the *Rubáiyát* of *Omar Khayyám.*

Le'gal Tender. See TENDER, LEGAL.

Legion, *Le' jun,* **of Honor,** a French order, established by Napoleon in 1802 for the recognition of merit in military and civil affairs. The order has been reorganized several times. The present ranks are: grand crosses, grand officers, commanders, officers, and knights, or chevaliers. The president of France is the grand master. Only those who have served with merit in military or civil affairs can become members. The emblem is a star inscribed with the words *République Française, 1870,* on the one side and *Honneur et Patrie* on the other.

Legislature, *Lej' is la" tchur,* that body of citizens in any state or nation which is empowered to make, alter and repeal the laws. In the earliest times of Greece and Rome the legislative power rested with assemblies, varying in numbers from the whole body of citizens to a few chosen representatives. In the Middle Ages all the functions of government, including the legislative body, were united in the king, emperor or feudal noble, but during modern times there has been a return to the ancient system and in most states laws are now made by assemblies. The legislative body of a country consists usually of two houses or chambers. In the United States these are called the Senate and

House of Representatives. The former is composed of two members from each state in the Union, while the members of the latter are apportioned to the states according to population, the two houses being officially known as the Congress of the United States. See CONGRESS.

In the United States the numerical strength of a state Legislature is prescribed by the state constitution. The Legislature of a state passes all state laws in the same manner in which the Congress of the United States passes laws affecting the general government. The houses of the state Legislatures depend upon standing committees for the preliminary examination and preparation of their business, and many state constitutions forbid the passage of any measure which has not been referred and reported upon by such committees. Usually the members of each house of a state Legislature hold office for two years, although in a number of states senators are given a four-year tenure, half of them retiring every two years.

Leibnitz, *Lip' nits,* **Gottfried Wilhelm,** BARON VON (1646-1716), a noted German scholar and philosopher, born in Leipsic. At the age of 15 he entered the local university, where his father had been professor of law; later he studied at the universities of Leipsic and Jena. He served in the Court of Appeals for the Elector of Mainz; went to Paris, where he submitted to Louis XIV a plan for the invasion of Egypt in order to turn his attention from Germany; visited London, met Sir Isaac Newton, and was elected to the Royal Academy; and in 1676 entered the service of the Duke of Brunswick-Lüneburg as counselor and librarian. Here he spent the most of his subsequent life. He visited most of the important cities, and became acquainted with most of the prominent scholars of Europe. He was organizer and first president of the Berlin Academy; furnished Peter the Great with a plan for the Academy of St. Petersburg; and was appointed imperial counselor by Emperor Charles VI and presented with a baronage.

Leibnitz was eminent in nearly all departments of knowledge. In mathematics he shared with Newton the honor of discovering differential calculus. His greatest reputation, however, is as a philosopher. The fundamental feature of his philosophy was his conception of substance. In attempting to resolve the dualism between mind and matter, the empiricists, or realists, reduced both to a materialistic substance and regarded mind only as refined matter; the idealists, on the other hand, considered mind as the great reality, of which matter was only a grosser form. Leibnitz was a strong advocate of the latter position, and he was one of the most gifted scholars that had ever lived. With rich and extensive learning, he united mental powers of the highest order.

Leicester, *Les' ter,* the capital of Leicestershire, England, situated on the Soar, 100 m. n.w. of London. The surrounding territory is a famous agricultural and wool-raising region, and the industries include wool combing, dyeing and lace making and the production of boots, shoes, woolen goods and hosiery. The town was known to the Romans as Ratæ, and was the seat of a bishopric from 680 to 874. Population, about 212,000.

Leicester, *Les' ter,* **Robert Dudley,** EARL OF (about 1532-1588), a favorite of Queen Elizabeth and brother of Guilford Dudley, the husband of Lady Jane Grey. After Mary had cleared her path to the throne by the slaughter of Guilford, his father and Lady Jane, Robert took up arms against her, was captured, sentenced to death and sent to the Tower. Mary, however, pardoned him and made him master of ordnance. When Elizabeth came to the throne he was made master of horse, and was the constant recipient of high honors and favors from the Queen until his death. He was a man of great ability and rendered much valuable service to his Queen and country.

Leif, Ericson, or **Leif the Lucky,** the first-known European discoverer of North America. He was the

son of Eric the Red, who founded the first Scandinavian settlement in Greenland, and his adventures are described in the Icelandic Sagas. In 999 Leif visited the court of the King of Norway, and on his return trip to Greenland he was driven out of his course by contrary weather to the shores of a new country which he called Vinland. The site of the settlement made there has been variously placed, on Labrador, on Newfoundland and on Nova Scotia.

Leighton, *La' tun,* **Sir Frederick** (1830-1896), a celebrated English painter and sculptor, born in Scarborough, England. His general education was acquired in Frankfort, Germany, his art training in Rome, Berlin and Florence. In 1868 he was elected a member of the Royal Academy and ten years later became president. The universities of Oxford, Dublin, Cambridge, Edinburgh and Durham conferred honorary degrees upon him, and he received besides various other European insignia of distinction. He was knighted in 1878. The greater number of his pictures are based upon literary subjects, many of them classical, while others spring from a purely æsthetic impulse. In the former class belong such praiseworthy works as *Venus Disrobing for the Bath, Electra at the Tomb of Agamemnon* and *Helios and Rhodes;* and the latter include *The Music Lesson* and *The Summer Moon.*

Leipsic, *Lip' sik,* a city of Germany, the first in commercial importance in Saxony, situated on the Parthe, Elster and Pleisse rivers, 70 m. n.w. of Dresden. The old, or inner, city is quaint and medieval with its narrow streets and 16th century architecture. The Augustusplatz, one of the largest squares in Europe, contains the university, the new theater, the post office and the museum. On the market square and throughout the city are the monuments of Germany's prominent statesmen, musicians and writers. The University of Leipsic is the third largest in Germany and among the greatest universities in the world. Near the beautiful old Rathaus is Auerbach's *Hof,* immortalized in Goethe's *Faust;* along the promenade is the Pleissenburg, where Luther and Eck held their famous disputation. Leipsic is the center of the book and publishing trade of Germany, surpassing London and Paris in the number and total value of its sales. The founding of the conservatorium by Mendelssohn in 1843 has made it an important musical center. Industries and trade have developed rapidly within recent years. The three annual fairs, held at Easter, Michaelmas and New Year's, attract merchants from all parts of Europe and from several countries of Asia. Population in 1905, 502,570.

Le'land Stan'ford Junior University, at Stanford University, Cal. (1885). This is a nonsectarian institution with an endowment of about $25,000,000, established by Leland Stanford and named for his son, Leland Stanford, Jr., "to qualify students for personal success and direct usefulness in life." Open to both sexes, the number of women students is limited to 500. The university, although an endowed institution, is in its administration practically a public university of the most liberal type. Approximately three-fourths of the college course is elective. It maintains many departments, has a faculty of about 250 members and confers degrees without regard to the time spent, whenever the requirements are met. The library contains some 300,000 volumes. The normal enrollment is about 2200. Some of its buildings were damaged by the earthquake in 1906, but were later restored. See STANFORD, LELAND; JORDAN, DAVID STARR.

Le'ly, Sir Peter (1618-1680), an eminent painter, German by birth, English by adoption. After studying in Haarlem with Pieter de Grebber, he removed to England, where he found favor at court. After the death of Van Dyck he became the leading portrait painter of England. Charles I, Cromwell and the ladies of the court of Charles II were among his chief sitters. Lely received the honor of knighthood in 1679.

Lemieux, Rodolphe (1866-), a Canadian statesman, born in Montreal and educated at Laval University. A leader of the bar, he has practiced in Montreal, in 1902 having been appointed crown prosecutor for the District of Montreal. A liberal, he entered the House of Commons in 1896. From 1904 to 1906 he was solicitor-general of Canada, and from then until October, 1911, he was successively postmaster-general and minister of marine and fisheries in the Laurier administration. He has been professor of the history of law at Laval University.

Lem'ming, an Arctic animal of the Rat Family and interesting because of a few striking peculiarities. It is a plump, fur-bearing animal of varying color but with black-striped face. In the summer the lemmings dig their burrows under stones, and their foreclaws are sharp but slender. In winter, when they must live entirely underground and dig continuously, their claws have leathery pads underneath, which drop off at the approach of spring. Every 10 or 12 years hordes of lemmings sweep across the Scandinavian peninsula, traveling straight east or west. Undiverted in their course by mountain, valley, lake or river, they travel in multiplying droves, feeding as they go, attacking viciously any opposing enemy, until they reach the sea, into which they leap only to drown before many feet from the shore. An American lemming, called the pied lemming, is dark in summer but turns white in winter.

Le Moine, *Le Moin',* **Sir James MacPherson** (1825-1912), a Canadian author and naturalist, born in Quebec and educated at Le Petit Séminaire de Québec. In 1850 he was admitted to the bar, previously having become collector of inland revenue at Quebec, and in 1869 he became inspector. Sir Le Moine, who was knighted in 1897 for literary services to Canada, was not only an authority on early Canadian history, but as an ornithologist he gained a wide reputation. His writings include *The Ornithology of Canada, Legendary Lore of the Lower Saint Lawrence, Maple Leaves, The Tourist's Note Book, Picturesque Quebec* and *The Birds of Quebec.*

Lem'on, a low tree of the Rue Family, belonging to the same genus as the lime and the orange. The name is also commonly applied to the fruit of the tree. The tree itself is spreading, with long, willowy branches thinly set with pale green leaves. The flowers are small, five-petaled and streaked with purple or reddish lines on the outside. These flowers, though fragrant, are less so than those of the orange. The fruit is egg-shaped and is botanically a berry; its pulp, which is covered by a tough yellow rind, is juicy and contains a high percentage of citric acid.

In sections where lemon growing has become an industry, much care is taken that the fruit shall be perfect. The lemons are picked when green, and laid upon trays in cool, dark rooms, to ripen; in this way the rind becomes tougher and thinner and is less liable to injury in shipping. The color, too, becomes clearer. When they are ready to be shipped, the lemons are sorted, graded according to size and quality, wrapped in tissue paper and packed. In this way they can be kept several months. Lemons are used in large quantities in the United States as food and drink and in medicine. The oil extracted from the rind is used in making extracts and perfumes.

The lemon tree is a native of India and is said to have been brought to England during the Crusades. It was early carried to Florida, and thence to California. On account of its need of much water, the lemon did not flourish in California until systems of irrigation began to be perfected, but the industry has become very profitable.

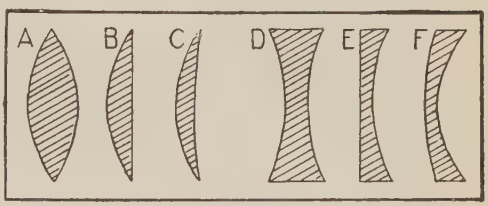
Lemon, Mark (1809-1870), an English author and editor of *Punch,* born in London. Together with Henry Mayhew he established *Punch,* a humorous, weekly paper, in 1841, and supported the venture by the profit of his plays, of which he produced more than 60, in the form

of comedies, melodramas and operettas. He was successful as an actor and wrote novelettes, stories, songs, lyrics, fairy tales and a volume of jests. His humor brought him great popularity.

Le'mur, a family of small, furry animals belonging to the order Primate, seeming to be the connecting link between the Primates and the lower orders. Members are chiefly found in Madagascar, although many have been brought away for menageries, and as they breed readily in captivity they are not unfamiliar. They are about the size of a cat, but their faces are more doglike and they have long tails. The true lemurs have soft fur of beautiful color and texture. They climb about the trees with agility. The loris is a lemur found in the East Indies. There are two species,—the slender loris and the slow loris, so called because of its very deliberate movements.

Lenine, Nicholas, otherwise **Vladimir Ilyic Uljanov** (1871-), a Russian socialist leader, the principal figure in the second revolution of 1917 that overthrew the provisional government of Kerensky and established the Bolshevist regime in Russia of which he was the head. He was born of a noble family, in Simbirsk, on the Volga. While a mere school boy he took great interest in socialistic literature and was expelled from the University of Kazan for his activity in spreading its tenets. In 1895 he formed an organization of workmen that later became the Social Democratic Party of Russia. For so doing he was exiled to Siberia. He was soon allowed to return but, he passed most of his time thereafter in various European countries outside of Russia. He labored unceasingly to advance the cause of socialism in Russia, and especially the Bolshevist wing of that party. He was a man or iron will, intensely in earnest, fanatical in adherence to the radical tenets of his party, and an eloquent expounder of them.

Lens, a transparent object having at least one curved surface, the surface being generally a small part of a spherical surface, and used in optical instruments for producing images by suitably changing the directions of rays of light. Lenses are named according to their shape: that having two convex surfaces is double convex (A); having one plane and one convex surface, plano-convex (B); having two concave surfaces, double concave (D); having one concave and one plane surface, plano-concave (E); having one surface convex and the other concave but the convexity less than the concavity, convexo-concave (F); having one surface convex and the other concave but the convexity greater than the concavity, a meniscus (C). A line passing through a lens, generally at its center, perpendicular to its central plane, is called its axis.



LENSES

The general effect of a convex lens is to converge light. As the rays from a point diverge and pass through the lens they are refracted in such a manner as to bring them all to another point, upon the other side. The two points are called

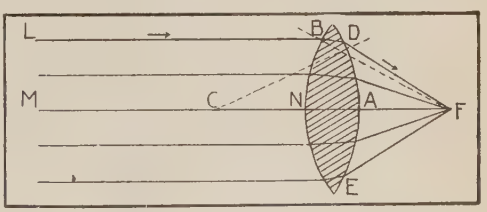


FIGURE 1

conjugate foci. If the rays of the sun are so collected by a hand lens, the heat generated at the focus, in this case called the principal focus, is sufficient to start a blaze in paper or fine, dry sticks. (Figure 1.) If a room be darkened and a ray of light admitted through a small aperture, over which a convex lens is placed, a clear, colored but inverted

image of objects outside will be thrown upon a card or screen held at proper distance from the lens. (Figure 2.) The explanation of this is found in the diagram. The ray AA′ passing through the center of the lens is not refracted,

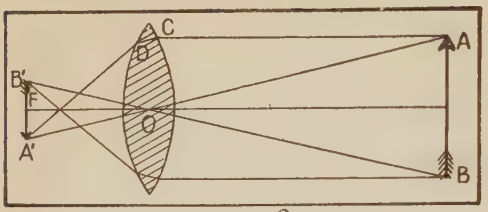


FIGURE 2

while the ray AC is bent to D, and, emerging, meets AA′ at A′. In the same manner the rays from B meet at B′. The screen F must, therefore, be held in the position B′A′ in order to secure a clear image. Such an image is called a *real* image, as it is formed when the rays of light actually meet. The object from which the image is made must also lie at some distance from the lens. If, however, the object lies between the principal focus and the lens, the image is larger than the object, is not inverted and is on the same side of the lens as the object. This is illustrated by means of a simple microscope in which an object appears to lie at greater than its actual distance, and to be enlarged. Such an

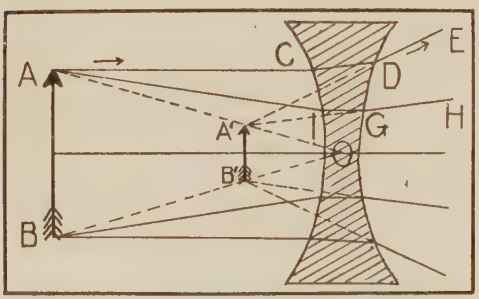


FIGURE 3

image is called a virtual image, while that formed in the first instance and seen upon the screen is called a real image. The general effect of a concave lens is to form small, virtual but erect images. In Figure 3 the object AB appears at A′B′ very much reduced. Concave lenses are frequently called reducing glasses.

Lenses are used practically in innumerable ways. In spectacles they aid the vision and assist in correcting errors of the crystalline lens of the eye. In microscopes and telescopes, they enable objects to be seen and studied which could not be observed with the unaided eye. In science they have aided in the study of light. See CAMERA, PHOTOGRAPHIC; MICROSCOPE; STEREOSCOPE; SPECTACLES; EYE; CAMERA LUCIDA; OPERA GLASS; TELESCOPE.

Lent (meaning Spring), a Christian fast in preparation for Easter. It begins on Ash Wednesday, a day which derives its name from a still prevailing Catholic custom of putting blessed ashes on the heads of the faithful to remind them that they are dust and that unto dust they shall return. The original fast of 40 hours honored the time between Christ's death and the Resurrection. In 420 the fast had increased to 36 days. These were gradually changed to 40 days in commemoration of Our Lord's fast in the desert. Observance of Lent is much more uniform today than in early times, when there were no dietary restrictions, and when good works and alms were merely recommended as a pious practice. The carnival of the Mardi Gras immediately precedes Lent.

Len'til, a plant of the Pulse, or Pea, Family, closely related to the garden pea and, like it, the source of a nourishing food. There are several varieties of lentils all rather more common in southern Europe than in the United States. The seeds which are borne in pods are reddish in color and mealy in consistency. Their thin, smooth surfaces, doubly convex in form, were familiar to the ancient scientist who ground his glass into their shape and called his product a lens. Lentils and pottage, a cooked food made from lentils, are frequently mentioned in the Bible as a common, nourishing dish.

Le'o, The Lion, the fifth sign of the zodiac, and a prominent constellation containing about 100 stars and interesting nebulæ. The most conspicuous part

of the constellation is a group of stars called the Sickle. It is from this point that the November shooting stars seems to radiate. The sun enters Leo about July 22. The sign is ♌.

Leo, the name of 13 popes. The first of these was known as Leo the Great and was pope from 440 to 461. In history he is remembered chiefly for his famous interview with the Hun, Attila, when he was about to enter Rome.

Leo II was pope but one year (682-683). He was called the Saint for his work of pacification between the sees of Rome and Ravenna, and he gave much attention to the music of the Church.

Leo III was pope from 795 to 816. He it was who crowned Charlemagne, thus giving the sanction of the Church to his assumption of the title Roman Emperor.

Leo X was the son of Lorenzo the Magnificent. He was early dedicated to the Church, but, in spite of his studious life, was involved in the varying fortunes of the Medici. He was chosen pope in 1513 and his pontificate lasted until 1521. This period was marked by a great advance in learning and in the arts, all of which were encouraged by Leo. His plans for rebuilding St. Peter's and the consequent use of indulgences are said to have brought about, or at least hastened, the Reformation. Leo issued the bull of excommunication against Luther which was later publicly burned by the Reformer (See Luther, Martin).

Leo XIII (Gioacchino Pecci) (1810-1903), Pope of Rome from 1878 until his death. He was born of noble family at Carpineto, Italy. When he was eight years of age he began to study in the Jesuit College of Viterbo with the view of entering the priesthood. At the age of 27, while still in minor orders, he was made domestic prelate by Gregory XVI. The same year he was ordained priest, being shortly sent to the hard post of Benevento, a refuge for outlaws, where his wonderful rule has been called "a little epic." In January, 1843, Pecci became Papal Nuncio to Brussels. The next month he was consecrated Archbishop of Damietta, and in 1846, under Pope Pius IX, he became Bishop of Perugia, where for over 30 years he was a good shepherd to his people. In 1853 Pecci was created cardinal and in 1877 he was made chamberlain of the Sacred College. On Feb. 20, 1878, by a vote of 45 out of 61, he was elected successor to Pius IX, assuming the title Leo XIII.

As pope, Leo XIII's earliest work was to restore the Roman Catholic hierarchy to Scotland. His first encyclical emphatically condemned the growing tendency to profane the holy nature of marriage. In 1879 an encyclical aimed a blow at socialism, communism and Nihilism. This was read in all Roman Catholic churches throughout Russia. In 1882 the Pope used his utmost power to moderate the Irish political movement, and important encyclicals were directed against anti-religious Freemasonry and against slavery. This last was addressed to the bishops of Brazil.

Leo XIII was ever a warm friend of the United States, establishing the Catholic University at Washington and taking deep interest in the Columbian Exposition. Besides being a philosopher, statesman and a remarkably holy priest, Leo was the author of exquisite Latin verse. His rule made a lasting impression on the latter part of the 19th century.

Leominster, *Lem' in ster,* **Mass.,** a town and village of Worcester Co., 54 m. n.w. of Boston and on the New York, New Haven & Hartford Railroad. The chief manufactures include furniture, cement, brick, piano cases, paper and toys. Population of the town and village in 1920, U. S. census, 19,745.

Leon'idas, a Spartan king who ascended the throne in 491 B. C. During the invasion of Greece by Xerxes, Leonidas seized the Pass of Thermopylæ, with some 300 Spartans and about 6700 men from various other Greek states. He did not know that over the mountain was a path by which the pass might be avoided; but this was betrayed to Xerxes by a renegade named Ephialtes. Upon being attacked from the rear, Leonidas soon fell, his followers being

slain after four advances. The Persians lost 20,000 men. This occurred in the summer of 480 B. C.

Leopard, *Lep' erd,* a handsome animal of the Cat Family now never found north of Turkestan and the Himalayas in Asia, and of the Sahara in Africa. It is a cunning animal, living in caves upon rocky hillsides and stealthily descending by night to prey upon small cattle, ponies and even birds, Rodents and insects. It also devours carrion, thus making its slightest scratch dangerous. Its body is lithe and slender, its limbs and tail are long. In color it is generally tawny or yellow, with groups of black markings surrounding a clear, light space; these markings differ, however, in species found in different countries, but all are beautiful and the skins are very valuable. Occasionally a black leopard is found; this species is very ferocious and is commonly known as the panther.

The leopard is an active animal, easily aroused and dangerous to combat. Its cry is a coughing roar generally heard about nightfall, when its depredations are about to begin. The ounce is probably a variety of leopard adapted to colder climates. See OUNCE.

Le'opold II (1835-1909), King of Belgium from 1865 until his death. He was the eldest son of Leopold I, whom he succeeded. One of his early royal acts of note was the formation of the African International Association for the exploitation of the newly-discovered sections of Africa. Much of the money which made possible Stanley's explorations was furnished by Leopold personally. In consequence, the Congo Free State was, upon its establishment, given to the authority of Leopold (1885). In 1905-1906 the infamous practices carried on in that country, unrestrained by the King, led to grave censure of the Belgian Government and nearly cost Leopold his African possessions. Reforms in the territorial government were planned in 1907, but were not in active operation until after the death of the King. Leopold II was succeeded by his nephew Albert.

Lep"idop'tera, a group of Insecta represented by the butterflies and moths. The name means scaly wing and is given because the four wings are covered by tiny scales. Members of this class undergo complete metamorphosis; that is, they pass through the four stages of insect life. The larval, or second, stage is called the caterpillar; and the third, or pupal, stage is passed in a condition of complete inactivity. The Lepidoptera are the most beautiful insects and are probably the most appreciated, although in the larvel stage many are destructive. The carpet moths, clothes moths and tree-dwelling caterpillars are among the most harmful. See BUTTERFLY; CATERPILLAR; MOTH; INSECTA.

Lep'rosy, a parasitic disease, affecting the skin. In every case it begins with the appearance of copper-colored blotches on the skin, which later turn white; and it is characterized throughout by a falling away and scaling off of dead skin. There are several different forms of the disease. One of these is characterized by tubercles beginning around the eyebrows, which develop into ulcers and cause the hair to fall out. The tubercles sometimes form in the throat, causing great discomfort. Another type is marked by numbness and insensibility of the parts affected, restlessness and insomnia. A violent and loathsome form of the disease is that which destroys the tissues and bones and which results in hideous deformity.

In ancient times leprosy was more widespread than it is today, and prevailed among classes exposed to unsanitary conditions. It is more generally present in India, China, Japan and the Philippine Islands than elsewhere. The lepers of the Hawaiian Islands are confined in a settlement on the Island of Molokai, where they number about 1300. Recent investigations have demonstrated that leprosy is caused by a bacillus or germ, and that it can be spread by such insects as flies, gnats and mosquitoes. Several physicians have prepared a vaccine, which is proving successful in staying the progress of the disease, and

which in some instances has wrought permanent cure.

Le Sage, *Le Sahzh',* **Alain René** (1668-1747), a French novelist and dramatist, born in Sarzeau. He turned from law to literature and earned a living by making translations from the Spanish, and through the patronage of the Abbé de Lyonne, from which he gained a pension. His original work attracted attention, and the masterly comedy *Turcaret* ranks among the best of its kind in French literature. From 1715 to 1735 he worked on his great novel, *Gil Blas,* for which he is famous. It is the story of a self-made man, told with satiric realism, and aims to trace character development through the influence of environment. His style is easy and he writes with an absolute truth to nature.

Lesseps, *Le" seps',* **Ferdinand,** VICOMTE DE (1805-1894), a French engineer and diplomat, born at Versailles, France. He became interested in great engineering enterprises, proposing canals across the Isthmus of Panama and the Isthmus of Suez, and the conversion of the Sahara Desert into an inland sea. He had charge of the construction of the Suez Canal, and in 1879 he became president of the French company which attempted to construct the Panama Canal. Following the collapse of the enterprise, M. de Lesseps retired to private life. See PANAMA CANAL; SUEZ CANAL.

Les'sing, Gotthold Ephraim (1729-1781), a German critic and dramatist, born at Kamenz. He was admitted to the University of Leipsic at the age of 17, disappointed his father by turning to neither theology nor medicine, and early began to support himself by hack translations and critical reviews. On going to Berlin he met Voltaire, and though their friendship was brief, Lessing profited by the association, which widened considerably his horizon and sympathies. In 1758 he began to publish the literary *Letters,* which mark the beginning of the classical period in German literature, and distinguish the author as the father of German criticism. The *Laokoon,* a classic of art criticism, was published in 1766; his greatest drama, *Minna von Barnhelm,* in 1767. Other works of importance were *Emilia Galotti, The Training of Mankind* and *Nathan the Wise.* As a critic, Lessing performed great service to German literature, ridding it of the old, orthodox canons of art, which restricted and did not inspire. In religion he was in sympathy with a lofty and tolerant Christianity, and his views stood in striking contrast to the old religious philosophy. His name ranks among the most eminent in German literature.

Le Sueur, *Le Seu" ur',* **William Dawson** (1840-), a Canadian author, born in Quebec and educated at the Ontario Law School and at Toronto University. From 1856 to 1902 he was in the post-office department of the Canadian civil service, after 1888 being secretary of the department. For more than 20 years he was an editorial contributor to the Montreal *Gazette* and, later, to the Montreal *Star.* He also wrote occasionally for the Ottawa *Citizen* and has had articles in such periodicals as the *North American Review,* the *Commonwealth,* the *Westminster Review* and the *Queen's Quarterly.* Possibly the most important of his works is his *Life of Frontenac,* which was written for the *Makers of Canada* series. Others of his writings include *A Defense of Modern Thought, Partizan Politics* and *The Development of Responsible Government in Canada.*

Leth'bridge, a town of Alberta, Canada, situated on the Belly River and on the Canadian Pacific and Alberta railways, 144 m. by rail s.e. of Calgary. It is an important railway center, and its coal-mining industries are extensive, five rich mines being in operation. The fertile countrysides yield good harvests of grain. The manufactories include flour mills, a woolen mill, ironworks, brickworks and a brewery. Population in 1911, 8050.

Le'the (from the Greek word meaning forgetfulness), in ancient myths, one of the five rivers of the lower world.

Its waters made those who drank of it unmindful of their past existences. Souls entering Elysium drank to forget their earthly woes.

Lettuce, *Let' is,* a familiar garden plant of the Composite Family, grown for its tender, juicy leaves which are used as salad. It has smooth, yellowish-green foliage, which in some varieties develops a head much like the cabbage. Lettuce is blanched like celery by covering it from the light, but spring lettuce, which is the most crisp and tender, is generally sold green. The young leaves are the most desirable. The flower stalk lengthens as soon as the leaves are developed and bears numerous blossoms and, later, abundant seed. Lettuce is one of the most rapidly growing of garden plants and the most easily raised. It is grown in hotbeds and gardens everywhere, but the chief source of supply for the seeds is California. Lettuce leaves contain opium, and from the juice of one variety a soothing drug is prepared.

Prickly, wild or Canadian lettuce is a troublesome weed of an allied genus that has lately gained a foothold in the United States. It is a tall, leafy plant growing rapidly to a height of from two to four feet. The stems are prickly and contain a thick, milky juice. The leaves are light green or even yellowish in color and are often so sharply toothed as to be also prickly. The young plants should be pulled as soon as they appear, for the blossoms develop so quickly that the downy seeds are ready to scatter early. If pulled after the flowers bloom, they should be burned, as the seeds may develop after the plant has been uprooted.

Letvia, see LATVIA.

Leuctra, *Luke' tra,* **Battle of.** See THEBES.

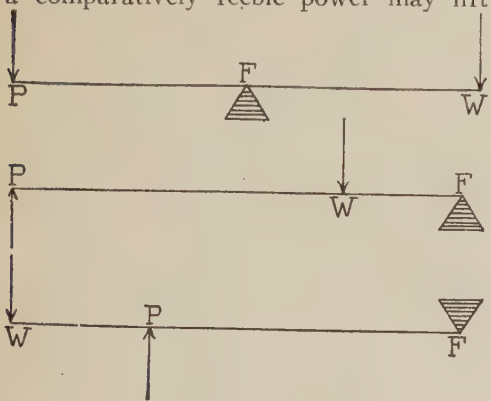
Leutze, *Loit' se,* **Emanuel** (1816-1868), an American painter of historical subjects. He was born in Gemünd, Württemberg, but came to the United States with his parents while he was still young. He studied painting first with J. A. Smith, a Philadelphia portrait painter, and later in Düsseldorf, Venice and Rome. He lived abroad for several years, but returned to the United States in 1859 to remain here until his death. His pictures are interesting and popular because of their excellent composition and simplicity. Technically they are less admirable. Some of his best-known works are *Washington Crossing the Delaware, Landing of the Norsemen in America, The Court of Queen Elizabeth, The Iconoclast, Washington at Monmouth, Westward Ho* and the fresco on the staircase of the Capitol at Washington entitled *Westward the Star of Empire Takes Its Way.*

Levant', a poetical term once used to refer to all Eastern, or Oriental, countries, but now indicating only the Mediterranean countries east of Italy and as far east and south as the Nile.

Lev'ee, originally a French term applied to embankments constructed to confine streams to natural channels and to prevent the water from overflowing level tracts of land. In the United States the term is applied to the embankments along the lower Mississippi River, which extend almost continuously from Cairo to the Gulf of Mexico. Other levees of vast extent are those of the Ganges River in Asia and of the Po River in Italy, while the embankments found in Holland are more properly dikes or dams or single jetties. See JETTY; MISSISSIPPI RIVER.

Le'ver, a simple machine consisting of an inflexible bar, which acts freely over a fixed point called the fulcrum. The parts of the bar on each side of the fulcrum are termed the arms of the lever: from the *weight* to the fulcrum is the *weight arm;* from the *power* to the fulcrum, the *power arm.* It is usual to divide levers into three classes, known respectively as levers of the first, second and third class. In levers of the first class the fulcrum lies between the weight and the power; such a lever is used when a stone is pried up by a crowbar. The earth or a block under the bar acts as the fulcrum and the power is applied at one end to lift the weight at the other; a steelyard is also a familiar lever

of this class. In a lever of the second class, the weight lies between the power and the fulcrum. Such a lever is in use in the human body when we stand upon our toes. The floor is the fulcrum, the weight is the body itself and the power is the muscle of the leg which is fastened to the end of the heel bone. In a lever of this kind the power arm is always longer than the weight arm, and a comparatively feeble power may lift



CLASSES OF LEVERS

a great weight. There is loss in extent of movement, since the weight is always raised less than the power. A lever of the third class has the power applied between the weight and the fulcrum. In this the power arm is always shorter than the weight arm, which is a mechanical disadvantage; a gain is made, however, in swiftness and extent of movement. The forearm is a lever of the third class, having the elbow as the fulcrum, the hand as the weight and the muscle of the forearm applied between them, as the power.

In levers of all classes the one law of equilibrium holds; namely, that the weight multiplied by the length of the weight arm equals the power multiplied by the length of the power arm. The term *power,* as commonly used above, is not a good word for the purpose, as it means here strictly a force, and must not be confused with its proper and more general meaning, which is rate of doing work. When the lever acts upon another and that upon a third, etc., the resulting machine is known as compound lever. A familiar practical example of a compound lever is to be found in any platform scale or large wagon scale. Simple and compound levers are used in innumerable ways in machinery; but whatever the form of the lever, straight or bent, or whatever its position, the one law of equilibrium given above holds good.

Lever, Charles James (1806-1872), an Irish novelist, born in Dublin. After graduating at Trinity College, Dublin, he studied medicine at Göttingen, and in 1840 was appointed physician to the British Legation at Brussels. His visit to Canada in 1829 and a lengthy stay on the Continent gave him good material for his novels, which he began to publish as early as 1837. Among the prominent works are *Arthur O'Leary, Con Cregan* (for both of which he used personal experiences), *Harry Lorrequer, Charles O'Malley, Jack Hinton, the Guardsman, Roland Cashel* and *The Dodd Family Abroad.*

Levi'athan, the name of a huge aquatic animal mentioned in the Old Testament several times, and in *Job xli* described minutely. It has been variously identified as the crocodile, the whale or some species of serpent.

Lévis, *La" ve',* a city of Canada in the Province of Quebec, on the south bank of the St. Lawrence River and on the Grand Trunk, Quebec Central and Intercolonial railways. The city stands at the foot of a high natural bluff, which forms the bank of the St. Lawrence River. It is connected by ferry with the city of Quebec. The heights above the city are now occupied by three enormous forts of earthwork and masonry. The leading industrial establishments include tanneries, shipyards, knitting factories, a foundry, planing and saw mills and manufactories of boots, cigars, wax tapers and knit goods. Population in 1911, 7452.

Le'vites, the members of the tribe of Levi; in a more special sense, the members of the tribe who were set apart to be the assistants of the priests in the

Temple service. The priests belonged to the family of Aaron, also of this tribe. The Levites had special provisions made for their maintenance. They received tithes of the produce of the land and in turn gave a tithe to the priests. After the settlement in Canaan they were assigned 48 cities, six of which were to be cities of refuge. Thirteen of the whole number were set apart for the priests. The office of preserving, transcribing and interpreting the Law belonged to the Levites, and they read it every seventh year at the Feast of the Tabernacles. In the New Testament they are scarcely mentioned.

Levit'icus, the third book of the Bible and of the Pentateuch, the book of laws and ceremonies regulating the service of the sanctuary by members of the tribe of Levi known as the Levites, who were set apart to be the assistants of the priests.

Lewes, *Lu' is,* **George Henry** (1817-1878), an English author, born in London. After studying literature and philosophy in Germany, he returned to England in 1840, and devoted himself wholly to literary pursuits. He edited the *Leader* from 1849 to 1854, wrote novels and dramas and gradually turned to philosophy. His marriage with Agnes Jervis proved unfortunate and wholly different from his happy life with Marian Evans (George Eliot) after 1854. In philosophy he was a positivist, and in his *History* he aimed to prove that metaphysical truth is unattainable—a stand which he later modified. His works include *Biographical History of Philosophy from Thales to Comte; The Spanish Drama, Lope de Vega and Calderon; Comte's Philosophy of the Sciences; Life and Works of Goethe; Problems of Life and Mind;* and *On Actors and the Art of Acting.* The *Fortnightly Review* was founded by him in 1865.

Lewis, Meriwether (1774-1809), an American explorer, born near Charlottesville, Va. He was a volunteer in the United States army in the Whiskey Rebellion of 1794, and six years later was made captain in the regular army. He was President Jefferson's private secretary and was recommended by him to have charge, in connection with Capt. William Clark, of an expedition to explore the headwaters of the Missouri River and thence to cross the continent to the Pacific Ocean. The expedition was successful and the reports of the explorers produced a great deal of enthusiasm. Lewis was rewarded by Congress by the grant of 1500 acres of land, and in 1807 was made governor of Louisiana Territory. See LOUISIANA PURCHASE; LEWIS AND CLARK EXPEDITION.

Lewis and Clark Expedition, an expedition under the command of captains Meriwether Lewis and William Clark in 1804-6, the purpose of which was to explore the territory between the Mississippi River and the Pacific Ocean. The expedition was sent out by President Jefferson, as he recognized the importance of a thorough and accurate knowledge of the vast extent of country acquired by the United States through the Louisiana Purchase. The party started from St. Louis, Mo., May 14, 1804; ascended the Missouri River about 1600 m. and spent the winter in the camps of the Mandan Indians in what is now North Dakota. The following April, 14 men were sent back to St. Louis with collections and reports, and the expedition pressed on, crossing the Rocky Mountains in September, and on Nov. 7 coming in sight of the Pacific Ocean. After spending the winter on the coast the party started on the return trip March 23, 1806, and arrived at St. Louis on Sept. 23, after a journey of 8500 m. Lewis and Clark collected a mass of valuable information concerning the geography, the animal and plant life, the climate and the various Indian tribes of the territory traversed. See LOUISIANA PURCHASE.

Lewis Carroll. See DODGSON, CHARLES LUTWIDGE.

Lewis Institute, at Chicago (1896), a nonsectarian and coeducational technical school similar to Drexel Institute. It maintains day courses, attended by some 800 students of academic grade and by

about 350 who are doing college work. To men the institute grants the degree of bachelor of science in mechanical engineering. Women receive the B. S. degree in domestic science. Cooperative courses for shop apprentices are also maintained, with the cooperation of some 30 manufacturing companies. Students in these courses work alternately, for a week at a time, in the institute and in the shop. About 1000 students are enrolled annually for day courses, while 250 more are added by the summer courses of all grades. The evening classes, however, are even more largely attended. In these there are some 1200 men studying engineering and the mechanic arts, while 1000 students, of both sexes, are pursuing courses in mathematics, English, domestic economy, chemistry, Latin, German, Italian, pottery, bookbinding and physical culture. The institute has a library of some 20,000 volumes on technical subjects.

Lew'iston, Idaho, a city and county seat of Nez Perce Co., at the head of navigation on the Snake River, 30 m. s. of Moscow, the seat of the University of Idaho, and on the Northern Pacific, the Oregon Short Line and other railroads. Lewiston is one of the oldest towns in the state and is a modern city with fine brick blocks and electric railroads. It is the outfitting point for all of the great mines tributary to the city, the mines of Nez Perce County being among the most important in the state.

Lewiston is the site of a state normal school, one of the best in the West, and of the Visitation Academy, which was organized in 1897. There is an excellent system of public schools. The country around Lewiston affords splendid fruit farms, the largest vineyard being located near the city. Lewiston also has important lumber interests, large sums having been spent in building dams, logging railways and sawmills. Peck, Kamiah, Greer, Leland, Orofino, Vollmer and Nez Perce are among the prosperous towns of Nez Perce County. Population in 1920, 6,574.

Lewiston, Me., a city of Androscoggin Co., 35 m. n. of Portland and 30 m. s.w. of Augusta, the capital of the state, on the left bank of the Androscoggin River, opposite Auburn, and on the Maine Central, the Grand Trunk, the Portland & Rumford Falls and other railroads. The Lewiston, Augusta & Waterville and the Lewiston, Brunswick & Bath electric railways connect with the near-by towns and cities. The cities of Auburn and Lewiston are connected by four commodious iron bridges across the river, which here falls 60 ft. and furnishes one of the most important water powers in the country, utilized by an extensive system of dams and canals.

Lewiston is the second city of Maine in population and is situated in the heart of the Androscoggin Valley. The surrounding country is hilly and picturesque. The city has many miles of well-paved and shaded streets, a fine public library, a new city hall, a United States Post Office Building and a handsome city park of over ten acres. The Central Maine General Hospital, the Sisters' Hospital, a home for aged women, a young women's home and the Hesley Asylum for boys are located here. The city is the seat of Bates College, a nonsectarian and coeducational institution, and the first college in New England to open its doors to women. Among the college buildings are an auditorium, given by W. Scott Libbey of Lewiston, in 1909, and the Libbey Forum, for the use of the literary societies and the Y. M. C. A. college associations. There is also a new high school building. The Kora Temple, dedicated in 1909, is the headquarters of the Shriners of the state.

Lewiston derives its prosperity chiefly from manufactures and trade, among which are extensive manufactures of cotton goods, which include fine dress goods, ginghams, bedspreads, colored cottons, sheetings, twills, towelings, fine and coarse yarns, fancy shirtings, scarfs and table covers. The products of the woolen mills include cheviots, cassimeres, beaver cloth, meltons, blankets and repellents. One of the largest and most noted

bleacheries and dye works in the United States is located here. There are also boot and shoe factories, looms, leather-belting works, cotton-mill machinery works, carriage and wagon factories, farm-implement works, brick plants and machine shops. There is an important trade in cereals and live stock. The town was settled in 1770, when it became known as the Plantation of Lewiston. It was incorporated as a town in 1795 and chartered as a city in 1861. Population in 1920, 31,707.

Lewistown, Pa., county seat of Mifflin Co., 61 m. n.w. of Harrisburg, on the Juniata River, and on the Pennsylvania Canal and the Pennsylvania Railroad. It is surrounded by beautiful mountain scenery and is situated in a fertile farming district which has mineral deposits, especially of iron and glass sand. Lewistown has steelworks, blast furnaces, tanneries, flour and lumber mills and manufactories of pumps, hydrants, edge tools, brooms, hosiery and other articles. Population in 1920, U. S. census, 9,849.

Lex'ington, Ky., county seat of Fayette Co., located near the central part of the state, 82 m. s. of Cincinnati and 29 m. s.e. of Frankfort, the capital of the state; on the Louisville & Nashville, the Chesapeake & Ohio, the Lexington & Eastern, the Southern and other railroads, and in the famous Blue Grass Region of the state. It is surrounded by undulating hills and the prosperous farms for which this section is noted. The broad country roads leading into the city there become pleasant, shaded streets along which stand hospitable Southern homes.

Lexington has long been famous for its excellent race tracks, which are annually the scene of running and trotting races that attract great crowds. Aside from many attractive grounds of the public institutions, the city has beautiful Woodland Park, and the City Park, which is now the campus of the state university. Among the interesting public buildings are the courthouse, the Federal Building and the public library. Not far from the city lies Ashland, the estate of Henry Clay, now a famous stock farm, the house of which is a modern replica of Clay's old home. Elmendorff, said to have been the finest and most extensive stock farm in the world, was located six miles from the city. It has now been broken up into separate holdings.

Lexington is the home of many public organizations, and among its educational institutions are the Kentucky State University, with its beautiful campus, Transylvania College, the Kentucky University and Agricultural College, the Hamilton College and Sayre schools for girls, and St. Catherine's Academy, a Roman Catholic school. There are two excellent hospitals, St. Joseph's and the Good Samaritan, and two state reform schools, one for boys and one for girls. The Eastern Kentucky State Hospital, with 250 acres in its grounds, the Orphans' Industrial Home for negroes and the Odd Fellows' and Knights of Pythias Widows' and Orphans' homes are among the other interesting establishments. The commercial importance of Lexington consists chiefly in its trade in live stock, tobacco, hemp and grain and in its manufacture of tobacco products, flour, carriages, harness and saddles. Lexington enjoys the distinction of being the greatest loose-leaf tobacco market in the world, which is the result of five years' growth. The average yield of Burley tobacco sold on the Lexington Market is about 49,000,000 lb.

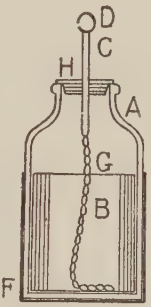
Lexington was first settled in 1775 by a party of four hunters who gave its name in commemoration of the Battle of Lexington. It was incorporated in 1782 and became a city in 1832. It was the capital of Kentucky from 1792 to 1793, and here the first Legislature of the state assembled. Lexington also had the first newspaper published west of the Alleghenies. It was the home of Henry Clay from 1797 until his death, and a handsome Corinthian column, surmounted by a statue of this statesman, has been erected to his memory. Population in 1920, U. S. census, 41,534.

Lexington, Mass., a city of Middlesex Co., 12 m. n.w. of Boston, on the Boston & Maine Railroad. It was settled in 1640 and was known as Cambridge Farms until 1691, when it was given its present name from Lord Lexington. The town is celebrated in American history as having been the scene of the first encounter between the British and Americans in the Revolutionary War, on April 19, 1775. There are many points of interest, among the number being Memorial Hall, with fine marble statues of John Hancock and Samuel Adams, Cary Memorial Library, the Lexington battleground and the soldiers' monument erected in 1799. A number of other monuments in honor of the patriots, and of the events which made Lexington famous, adorn the city. Pop., 1920, 6,350.

Lexington, Battle of, the first battle of the Revolutionary War, fought in a village northwest of Boston, Mass., Apr. 19, 1775. General Gage had secretly dispatched an expedition of 800 British soldiers to seize the military supplies which had been collected at Concord and to arrest Samuel Adams and John Hancock, who were said to be in hiding at Lexington. The movement of the troops became known and, at the suggestion of Dr. Warren, on the night of Apr. 18, Paul Revere rode from Charlestown to Concord, spreading the news. His arrival at Lexington, at midnight, gave Adams and Hancock time to escape the troops, who, when they came, were met on the Common by about 70 minutemen under Captain Parker. Pitcairn, the British commander, ordered the company to disperse, and some soldier accidentally fired a shot. In the skirmish which ensued, eight militiamen were killed and ten were wounded, whereupon the Americans prudently withdrew.

The British advanced to Concord, some ten miles farther on, only to find that the bulk of the stores had been removed and hidden and to be met by another force of 400 militiamen. These forced them to return to Boston. On the way the British were constantly fired upon by farmers, stationed behind trees and rocks, and the retreat became a rout. Fortunately, however, they were reinforced at Lexington by 1200 men under Lord Percy. The British lost 273 men; the Americans, less than 100. Within a few days after the battles of Lexington and Concord, 16,000 American volunteers gathered about Boston.

Leyden, *Li' den,* **Jar,** one form of an electric condenser, an instrument for retaining a considerable amount of electricity in a small place. It consists of a glass jar A coated with tin foil or sheets of copper or gold leaf B. The outside F, nearly to the neck, has also a coat of tin foil. It is stoppered with a cork H, through which passes a brass rod C ending in a knob D and connecting, generally by means of a metallic chain G, with the metal coating within. The jar is charged, that is, receives its electricity, by holding it by means of the outer coating and presenting the knob to an electric machine. If it is held to the positive terminal in this manner, the inner coating receives a positive charge and the outer a negative one. If held by the knob and the outer coat presented to the terminal the reverse is true. The positive electricity within and the nearly equal amount of negative electricity without, or vice versa, cannot produce any effect independently. If, however, the knob and the outer coating are joined, the two rush together and will even leap in a spark across a slight gap. The jar is then said to be discharged. Sometimes, in charging, the difference in potential between the charges of electricity on the two coatings becomes so great that in trying to get together they break the glass.



LEYDEN JAR

The Leyden jar may be discharged slowly or quickly. To discharge it slowly, it may be set upon an insulated plate, and first the knob and then the outer coating be touched with the hand

or with a metal conductor. To discharge rapidly, the two coatings can be touched with a discharger having insulating handles, and a spark will pass. The Leyden jar receives its name because it was first used in Leyden. Leyden jars of somewhat modified form are now much used in the production of high-frequency electric currents required in wireless telegraphy.

CONDENSER. The more general form of condenser consists of alternate layers of tin foil and insulating material, such as paraffined paper or mica sheets. The tin-foil sheets are smaller than the paper sheets, and all the odd-numbered sheets of tin foil are joined together on one side to a single terminal, and all the even-numbered sheets of tin foil are joined together on the other side to the other terminal. This arrangement acts in every respect like the Leyden jar above. It can, however, be made to store a far greater quantity of electricity, but it cannot stand so great a difference in potential between its two sets of tin-foil sheets or coatings as the Leyden jar can stand. Such condensers are much used in modern telephone work. See ELECTRIC CAPACITY.

Lhasa, *Lahs' ah,* or **Lassa,** the capital of Tibet, situated on the Kyichu River. The streets are narrow and lack of a drainage system makes them unhealthful; the houses are built of sun-dried bricks, stones or horns of oxen and sheep set in clay mortar. The important buildings include the Jokhang Temple, the palace of the Dalai-Lama and several monasteries. Aside from the traffic caused by the large number of students attracted by the monasteries and the pilgrimages of worshipers at Buddhist shrines, traders from China and the surrounding region swarm the city from December to March. The industries represented are weaving from fine Tibetan wool and the manufacture of fragrant sticks of incense, earthenware and wooden porringers. Population, estimated at 30,000.

Lib'by Prison, in Richmond, Va., a Confederate military prison of the Civil War. Before the war it had been a tobacco warehouse. It was first used as a prison after the first Battle of Bull Run, and continued to serve in this capacity till the close of the war, at times containing as many as 1200 prisoners. Of the many attempts at escape, the most famous occurred Feb. 9, 1864, when 109 men made their exit through an excavation 50 ft. in length. Of this number 59 safely reached the Federal lines. In 1888 the building was taken apart and carried to Chicago, where it was reconstructed, stored with many valuable relics, and in September, 1889, opened as the Libby Prison War Museum. After the World's Fair in 1893, the building was torn down and the Coliseum erected upon its site.

Li'bel, in law, "the publication of matter which tends to bring another into hatred, contempt or ridicule." Libel is a criminal offense and may subject the perpetrator to prosecution for the crime and also for damages to the party libeled. It is not necessary that the matter be printed to constitute libel, but it must be written and seen by a third party. Even if the libelous matter is accidentally placed before the third party, the writer is liable, for he may have done as much harm by accident as by intent. The publication of debates in public assemblies or of testimony given in open court is not libel, and in most states news gatherers and their publications have a large measure of protection. However, there are restrictions beyond which they must not go. The laws vary widely as to detail in different states.

Liberia, *Li bee' ri a,* a republic of western Africa having about 325 m. of seacoast on the Atlantic, and elsewhere bounded by Sierra Leone and the French West African possessions. The colony was founded in 1822 by the American Colonization Society and was designed to be a home for liberated slaves. In 1847 it became an independent state with a form of government similar to that of the United States, and was recognized by foreign powers. The interior of the country is mountainous and heavily for-

ested, and the slopes toward the coast are well watered and fertile. The resources of the country are not, however, well developed; rubber, palm oil, coffee, camwood, ginger, ivory and cocoa are exported, and cotton, sugar and fruits are produced for home consumption.

The people are negroes, many of whom are civilized; these have built churches, schools, printing establishments and one excellent college. Under the last American treaty, approved by France, Great Britain and Germany, the financial control is assumed by the United States, which also is responsible for internal administration of affairs. The country is divided into four counties, whose total area is 40,000 sq. m. Monrovia is the capital. The population is about 2,060,000, about 50,000 of whom are civilized negroes.

Lib'erty Bell, the bell which originally hung in Independence Hall, Philadelphia. It was brought from England in 1752 and was broken and recast in April, 1753. It announced the Declaration of Independence and for years was rung annually on the 4th of July. The bell bears the inscription: *Proclaim liberty throughout all the land unto all the inhabitants thereof* (*Lev. xxv, 10*). It is kept at Independence Hall, Philadelphia, but it was on exhibition at the Louisiana Purchase Exposition, St. Louis, in 1904.

Liberty Statue. See BARTHOLDI, FREDERIC AUGUSTE.

Li'bra, The Balance, the seventh sign of the zodiac. The sun enters Libra about Sept. 23. There is no distinguishing constellation. The symbol is ♎.

Li'brary, a collection of books, or other written or printed literature for public or private use; also the name of the building in which such books are kept.

ANCIENT LIBRARIES. Libraries are of very ancient origin, though only a few specimens of the earliest writings have been preserved. Rameses I, who reigned in Egypt about 1400 B. C., is reputed to have had a library of over 36,500 volumes. The books were written on sheets of papyrus in hieroglyphics. The sheets were rolled and carefully preserved. Nineveh and Babylon also had extensive libraries, but their books were engraved on clay tablets in cuneiform characters. The tablets were hardened by baking, and many have been found in a good state of preservation (See HIEROGLYPHICS; CUNEIFORM INSCRIPTIONS). The most famous of all ancient libraries was that at Alexandria, which is said to have contained at one time over 700,000 rolls (See ALEXANDRIAN LIBRARY). Whatever collections of literature the ancient Greeks may have made were destroyed or carried away by their conquerors. Some of the early Greek manuscripts were brought to Rome, and with similar spoils from the East constituted the beginning of the library among the Romans. Towards the close of the republic there appear to have been in Rome a number of valuable private libraries which were owned by wealthy men.

LIBRARIES OF THE MIDDLE AGES. During the Middle Ages the monks were the chief conservators of learning, and the monasteries contained most of the libraries of the period. The Arabs, however, became patrons of learning and established libraries at Cairo and Tripoli in Africa, Bagdad in the East and Cordova in Spain. Alfred the Great and Charlemagne were famous rulers who were interested in collecting libraries of their own, and they encouraged increasing the libraries in the monasteries. With the revival of learning in the 15th century the formation of libraries by wealthy families began, and some of these libraries have continued to the present time. Cosimo de' Medici, during his exile in Venice, in 1433, established a library, and on his return to Florence laid the foundation of the great Medicean Library. Another Italian collector of books was Niccolo Niccoli, who in 1436 left his library of 800 volumes for the use of the public.

MODERN LIBRARIES. Under this head are included the great libraries of the

present day, though some of them were founded in the Middle Ages. The largest are given in the following table:

Library	Books	Manuscripts and Charts
National Library, Paris	2,600,000	103,000
Library, British Museum	1,900,000	100,000
Library of Congress	1,892,000	1,017,500
St. Petersburg	1,100,000	28,000
Royal Library, Munich	1,000,000	40,000
Berlin	1,000,000	30,000
Strassburg University	760,000	
Oxford University	570,000	30,000
Cambridge University	500,000	6,500

The libraries of the universities of Göttingen, Leipsic, Copenhagen and Madrid each contain a half million or more books. The library at St. Mark's, Venice, has over 400,000 volumes and the Vatican Library exceeds 200,000 volumes.

United States. The first library in the United States, that of Harvard College, was founded in 1638. Yale and William and Mary colleges began their libraries in 1700 and by 1800 there were 21 college libraries in the country. The first public library was that of New York City, founded in 1700, and in 1754 changed to the Society Library, which name it still bears. In 1731 Benjamin Franklin founded the Library Company of Philadelphia, which established the first subscription library in the country. In 1800 the Library of the United States, later named the Library of Congress, was established. The first law authorizing taxation for the support of public libraries was the District Library Law of New York, passed in 1835. The first free circulating library in the United States and in the world was established at Peterboro, N. H. In 1849 New Hampshire passed a law authorizing towns to levy a tax for establishing and supporting free public libraries, and in 1851 Massachusetts passed a similar law. These were the beginnings of a movement which has since extended to nearly all states.

All cities have free public libraries, and some, especially those in New York, Boston, Philadelphia and Chicago, are large. The usefulness of these libraries is widely extended by maintaining stations at numerous convenient points throughout their respective cities and by cooperation of the libraries with the teachers of the public schools. Various states have also made provisions for placing libraries in all rural schools, as well as those in towns and cities. In addition to this, traveling libraries are found in a number of states, and through them every community within the state can be supplied with books suited to all classes.

Administration. The old idea of the library was to make it a reservoir; the modern idea is to make it a fountain. Until 1876 there was no organized effort to extend the usefulness of libraries to the general public. In that year the American Library Association was formed, and this organization has been the center of influence in securing the enactment of library laws and in the various movements which have extended the use of libraries to all communities. The organization publishes a *Bulletin*, in which it lists all books approved for libraries. It has also issued a very complete catalogue of books on all subjects.

Another great step in advancing the usefulness of libraries has been the adoption of the uniform system of classification and of cataloguing books devised by Dr. Melvil Dewey, formerly director of the Library of the State of New York, and a third step has been the housing of the thousands of libraries in attractive and commodious buildings. Many of these buildings were made possible through the munificence of Mr. Andrew Carnegie, who has built or contributed towards the building of many public library buildings throughout the country, most of them being located in small cities. Among the noted library buildings that of the New York Public Library, completed in 1911 at a cost of $9,000,000 ranks first in the world. Others are the Congressional Library at Washington, the Boston Public Library, the Chicago Public Library, the Carnegie Library at Pittsburgh and the library

buildings at St. Louis, the University of California, the University of Chicago and of the University of Wisconsin and Wisconsin State Historical Society at Madison.

LIBRARY SCHOOLS. The first library school was established by Dr. Melvil Dewey in Columbia University in 1887. Two years later it was removed to Albany and made a department in the New York State Library. There are now numerous library schools connected with libraries or universities throughout the country, some of the most noted being the Pratt Institute School of Library Science, New York City; Drexel Institute Library School, Philadelphia; Simmons College Library School, Boston; and the schools at Western Reserve University, Cleveland, the University of Illinois and the University of Wisconsin. The Carnegie Library at Pittsburgh maintains a school for training children's librarians. The purpose of all these schools is to train librarians and library assistants, so that they become thoroughly acquainted with systems of classification and cataloguing and are able to render quick and valuable aid to those seeking information.

Library of Congress, the national library at Washington, D. C., established by the government in 1800. It was destroyed when the British burned the Capitol in 1814, but a new beginning was made by the purchase of Thomas Jefferson's library. It was again partially destroyed in 1851, but since that year the library has continued to increase in size and influence. In 1897 the library was removed to the new building erected for it at a cost of $6,500,000, and at the time of its completion was the finest library building in the world. It contains over eight acres of floor space and 56 m. of shelving. The interior walls are incased in stucco or marble, and the mural decorations represent the work of over 40 of the finest American artists. The building is surmounted by a large copper dome 195 ft. high and bearing on its summit a gilded torch of learning.

The library is supported by appropriations made by Congress. It receives its additions through exchanges, through the deposit of copies of all books copyrighted in the United States and by purchase. It is the depository of all government publications, and has invaluable collections on national and state history. It also has in keeping the library of the Smithsonian Institution (See SMITHSONIAN INSTITUTION). In 1911 the library contained 1,892,000 books and 1,017,500 charts, musical compositions and other manuscripts, making it the third largest library in the world, being exceeded only by the National Library of Paris and the Library of the British Museum.

The Library of Congress is a reference and not a circulating library, but members of Congress, the president, vice-president, members of the cabinet and judges of the Supreme Court have the privilege of drawing books, which are always obtained by sending pages for them. Under certain restrictions books required for special investigation are loaned to public libraries. The library is open daily to the public under the necessary restrictions. Five hundred librarians, assistants, clerks, pages, engineers and janitors care for the library building and grounds. The copyright department employs about 70 persons.

License, *Li' sens,* in law, the privilege or authority given a person by the proper officials to conduct a business or perform certain acts, which, without such authority, would be illegal. Licenses are issued for two purposes, protection and revenue. In all states those trades and professions which are closely related to public health or public morals are required to be licensed. One cannot practice medicine in any form without a license from the proper authorities of the state. One cannot teach in the public schools without a license. In most cities one cannot do the work of a plumber without a license, and so on. Formerly when intoxicating liquors were sold, dram-shop licenses were required. The one procuring a license is required to pay a fee, and he must conduct his

business in accordance with the terms of the license. In case of doctors, teachers, pharmacists and others the applicant must pass an examination to prove his qualifications for the position he is to fill.

Lichen, *Li' ken,* a peculiar formation of the plant world consisting of a household of algæ and fungi living together in close relationship and mutually dependent in gaining a livelihood. The combination is collectively termed a lichen or a lichen plant, and by means of it lichens are able to live where neither algæ nor fungi alone could exist. They thrive under great exposure and are found in high altitudes and as far north or south as any plant can grow.

In structure, lichens are of three general classes: the foliose, or leaflike, which grows on old lumber, rough-barked trees and fences; the crustaceous, which form thin, shell-like coverings upon smooth trees and upon rocks; the fruticose, which hang in mosslike branches from trees or cluster upon the ground, and are represented by the reindeer moss and bearded moss. Lichens are useful to man in many ways. Deriving their food mostly from the air, they are enabled to live where other plants could not find nourishment. In assimilating their food they produce an acid which assists in wearing away rocks, thus forming soil; in this manner they form a foundation upon which seeds of higher plants, falling later, can take root and grow. In cold regions, where plant life is scarce, they form the chief food of herbivorous animals, and in time of scarcity of other vegetation some of the gelatinous lichens are used for food for man. They are also extensively used in the manufacture of litmus. See LITMUS.

Lick Observatory, an astronomical observatory situated at Mt. Hamilton, Cal., 4285 ft. above sea level, 26 m. from San José. It contains next to the largest refracting telescope in the world, the Yerkes alone being larger. Lick Observatory and its equipment were the gifts of James Lick of San Francisco, Cal. The objective aperture of the telescope is 36 inches, the point of suspension is 36 ft. above the floor, its focal length is over 56 ft., and the diameter of the dome is 36 ft. The total cost of the observatory was about $700,000. It has all modern appliances, spectrum and camera. The telescope was made by Alvan Clark, Boston, Mass. See TELESCOPE.

Licorice, *Lik' o ris,* or **Liquorice,** a stout plant of the Pulse Family, whose root and underground stem are valuable for the production of a sweet drug. The plant is native in Asia and southern Europe, and two species are found in the United States. Licorice grows to a height of three or four feet, and has long leafstalks upon which are borne several pairs of oval leaflets with an odd one at the apex. The flowers grow in full-blossomed clusters and are white or blue-tinted. The concentrated juice of the roots and stems is wrapped in bay leaves and shipped to the United States, where it is used to cover the bitterness of quinine, to flavor port wine and chewing tobacco, and to produce cough remedies, chewing gum and confectionery. Licorice is grown in Spain and Italy, and attempts have been made to cultivate it in the United States in Louisiana.

Lieb, Michael Leo. See MUNKÁCSY, MIHÁLY.

Liebig, *Le' bik,* **Justus von,** BARON (1803-1873), a German chemist. He became professor of chemistry at the University of Giessen in 1824 and established there one of the first laboratories open to the general student. On account of this laboratory and Liebig's skill as a teacher, Giessen became the most famous chemical school of the time. His chief experimental work was done along the line of organic analysis, in which he attempted to trace the connection between chemical laws and life processes. Liebig's literary works are numerous and valuable, and present accurate though voluminous accounts of his experiments. Personally, Liebig was generous, hospitable and noble in ideals. Consult *The Life Work of Liebig,* by A. W. von Hofmann.

Liège, *Le azhe',* capital of the Belgian province of the same name. It is situated on both banks of the Meuse at its confluence with the Ourthe, and in a region abounding in mineral wealth. The Meuse divides the city into two parts, the old town on the left bank, which contains the principal public buildings, and the new town on the right, the manufacturing center. Six main bridges span the river, and the city has waterworks, electric lighting, boulevards and good street-car service. Among several fine churches is the Cathedral of St. Paul, founded in 968. Other features of interest are the Palace of Justice, a handsome modern theater, the university buildings, the municipal museum and the zoological and botanical gardens. Liège manufactures guns and cannon, heavy machinery, watches, gold and silver articles, cloth, leather and paper.

Liège dates from about 558. In 1702 it fell before Marlborough. In 1801 it was ceded to France, was annexed to United Netherlands by the Congress of Vienna (1815), and in 1830 became a part of Belgium. Liège has had a strongly fortified position since 1888, when its twelve great forts were erected, six on each bank of the Meuse. In the European War of 1914 the city was captured by the German troops on their march through Belgium. Population in 1910, 174,268.

Lien, *Le' en,* a claim or hold which one person has on the property of another as a security for debt. In the United States liens are of two kinds, specific and general. A specific lien is one over specific goods for a debt contracted in respect to them alone. General liens do not exist at common law but depend upon agreement, and the person in possession may detain the goods, not only for his claim accruing from them, but also for the general balance of account with the owner. Statutory liens are acquired by filing a notice in the proper office for similar records, usually the office of the county clerk, and they are enforced by judicial proceedings corresponding to foreclosure.

Lieutenant, *Lu ten' ant,* an officer in the army and navy. In the army, lieutenants rank next below captains, the first lieutenant corresponding to master in the navy and the second lieutenant to ensign. In the navy, lieutenants correspond to captains in the army. See NAVY; COMMANDER; ENSIGN; ARMY.

Lifeboat. See LIFE-SAVING SERVICE.

Life Preserver, usually a form of belt designed to buoy up in water the person wearing it. It generally consists of sections of cork, sewed in a canvas covering, and is buckled around the waist, canvas straps being provided to go over the shoulders. There are life preservers made in the form of jackets, trousers and suits of rubber, which are made double and inflated with air. Mattresses stuffed with cork are sometimes used.

Life-Saving Service, a service maintained to lessen loss of life at sea. The life-saving system of the United States was organized in 1871. It now has about 300 stations located at points of danger on the coasts of the Atlantic, Pacific and Great Lakes. The station buildings are built to withstand severe winds and storms and tides. They are divided into suitable apartments, arranged for the accommodation of the crews and the storage of the life-saving appliances.

Usually a crew consists of a keeper and about eight men, who are selected for this work. They are required to be over 18 and under 40 years of age, and to be citizens of the United States. The keeper has full charge of the building and the control of the crew, whom he rules with rigid discipline, and from whom he requires frequent drills in handling the various apparatus and in methods of resuscitating the apparent drowned. When a shipwreck occurs, lifeboats, which are so constructed that they cannot sink, are sent to the points of danger, carrying life preservers and other appliances that may become useful. It requires from five to eight men to handle the lifeboat, but when it cannot be used, life lines are thrown to the stranded vessel by a small cannon, which shoots a ball carrying a light line. To

the shore end of this line a life line is attached, and when this has been hauled aboard and attached to the ship, a life buoy, or breeches buoy, can be sent over it to bring those on the ship to shore one by one.

The breeches buoy is a circular life preserver of cork, from which are suspended short canvas breeches. It holds one person, and is so arranged as to run along a line from the ship to the shore. Other appliances belonging to the station are boat wagons for hauling the lifeboats along the beach, roller boat skids, carts for loading apparatus, heaving sticks, cork jackets, signal flags, night warning signals, beach torches, patrol lanterns, hawsers, hauling lines, medicine chests with surgical instruments, bandages, etc. Gold and silver medals are awarded to those members of the crew who display unusual heroism.

The cost of maintaining this service is nearly $2,000,000 annually, and the amount of property saved frequently reaches the sum of $12,000,000, with many thousands of persons rescued.

Foreign Life-Saving Service. England, France, Germany, Russia, Austria, Belgium, Denmark, Holland, Italy and Spain all maintain a life-saving service, differing but little from that of the United States.

Lig'ament, in anatomy, a strong, tough, flexible membranous expansion of fibrous tissue, which binds the ends of the bones together and helps to control and limit the movements of the joints. Ligaments also serve to strengthen attachments between other parts of the body. They are of three kinds: those shaped like heavy cords, those in the form of flattened bands of various widths and lengths, and those in the form of a bag, such as the capsular ligament, which encloses certain kinds of joints. Ligaments differ from tendons in being of a stouter structure; they hold the bones of the skeleton together, whereas tendons serve to unite muscle with bone. They are inelastic, and dislocation of a joint often causes them to break, inflicting permanent injury. See Tendon.

Light, commonly, the sensation perceived by the eye; more technically, the wave motion which is able to produce this sensation. The wave theory of light assumes that all space is pervaded by a medium known as the luminiferous ether; certain bodies like the sun, a live coal, etc., have the power to set in motion, in this ether, waves of a certain rapidity of vibration, and this phenomenon is known as light. Bodies which are able to set these waves in motion are known as luminous bodies. The difference between heat and light is only a difference in wave-length, since those vibrations whose wave-length is greater than that of red or less than that of violet light are incapable of affecting the average eye, the former producing heat and the latter causing chemical changes. Bodies which reflect light but do not produce it are said to be nonluminous; those which transmit light clearly are transparent; those which transmit light, but not clearly enough to reveal through them the objects from which it comes, are transculent; those which effectually cut off the passage of light are opaque. A single line of light is known as a ray and a collection of rays is called a pencil, or sometimes a beam.

Velocity of Light. The velocity of light was first computed by the Danish astronomer Römer in 1675, from observations of the eclipses of Jupiter's largest moon. Recent determinations by other methods practically verify Römer's figures and show that light travels with a speed of 186,320 m. per second in a vacuum, or 186,270 m. per second in air. At this speed a train would go around the earth, at the equator, seven and one-half times in a second. For all practical purposes and for distances upon the earth the transmission of light is instantaneous.

Rectilinear Propagation of Light. From every point of a luminous body light is given off equally in all directions; thus a strong light that can be seen at night from a certain distance in one direction can also be seen from that distance in any other direction if

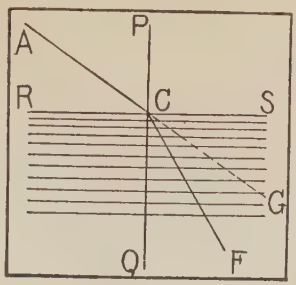
LIGHT

no objects intervene. In a uniform medium, like air, light travels in straight lines; this is evident from the fact that we cannot see around obstructions nor through bent tubes. If a small hole, about half an inch across, be made in the window of a well-darkened room, the rays of light coming from various objects outside pass through the hole and form an inverted image of the outside objects on the opposite wall of the room, or on a screen held a few feet from the hole. A small pencil of light from each outside point passes through the hole and illuminates just one small spot on the screen, and thus the entire image is built up.

INTENSITY. The intensity of a light varies inversely as the square of the distance from its source. At two miles from the luminous object the intensity is one-fourth as great as at one mile.

REFLECTION OF LIGHT. Light is reflected, when, upon striking a surface, it is turned back into the medium through which it was transmitted. It is by means of these reflected rays that objects become visible. On an ordinary rough surface these rays are greatly diffused and such objects are more plainly seen than objects having polished surfaces. When a ray of light falls upon a surface, the angle which it makes with a perpendicular to the surface at the same point is called the angle of incidence; the angle made by the reflected ray with the same perpendicular is known as the angle of reflection. The law of reflection of light states that the perpendicular, the original ray and the reflected ray lie in the same plane and that the angle of incidence and the angle of reflection are equal.

REFRACTION OF LIGHT. Refraction is the bending of rays of light on passing from one medium into another. If a straight pole be held partly under water and somewhat inclined, it will appear bent where it enters the water. The rays of light coming from the submerged part of the pole are bent or *refracted* as they pass from the water into the air; hence we see the submerged part of the pole apparently in a position different from its true position. In the illustration, R S indicates the surface of the water and P Q the perpendicular. A ray of light starting from F in the bottom of the stream is refracted at C and reaches the eye at A. The eye follows the ray back in a straight line and the point F appears to be at G.



REFRACTION

Prism. For studying the refractive properties of a substance, it is usually made into the form of a trigangular prism with its polished plane surfaces or faces making an angle of from 30° to 60° with each other. If a narrow beam of sunlight be directed upon one face of such a glass prism (preferably in a darkened room), as shown in the diagram, it will be refracted as it passes into the prism at the one face and again as it passes out of the prism at the other face. It will be noticed that the beam of light is both deviated by the prism and spread out into a band of color called a spectrum, the red being deviated least and the violet most, with the other colors between, as can readily be seen by letting the deviated beam fall on a white screen. This separation of white light into a spectrum is called *dispersion,* and is due to the fact that lights of different colors are refracted by different amounts on passing from one medium into another.

Refractive Index. Refraction of light on passing from one medium into another takes place because the velocity of light is different in different substances, and dispersion occurs because the velocities for the different colors are different in the same medium. The quotient of the velocity of light in a vacuum (or practically in air) divided by its velocity in the substance is called the *refrac-*

tive index of that substance for light of the particular color used; and the difference of the refractive indices for violet and red is a measure of the *dispersive power* of that substance. For example, the refractive indices for crown and flint glass are 1.534 and 1.587, respectively, for yellow light; for red they are 1.528 and 1.578; and for violet they are 1.551 and 1.614, respectively. The dispersive powers are accordingly 1.551—1.528, or .023, for crown glass; and 1.614—1.578, or .036, for flint glass. The study and manufacture of various glasses having different refractive and dispersive powers are of fundamental importance to the makers of photographic and other lenses, and of prisms and other glass parts of spectroscopic apparatus.

Nature of Light. Many theories concerning the nature of light have been held from time to time. Newton held that light consisted of minute particles or corpuscles sent out from luminous bodies with enormous speed, and that the sensation of light was caused by these particles hitting the eye. On this notion he explained the rectilinear propagation of light, reflection and refraction. Huygens (1629-1695) held that light was some form of wave motion different from sound, and adduced many reasons for his theory. On this notion were explained all the phenomena accounted for on the corpuscular theory, and in addition, polarization, interference and diffraction of light (See Polarization of Light; Diffraction). It is due to interference of light reflected from the outside and the inside surfaces of a soap bubble that the beautiful colors are seen, especially when the film becomes very thin.

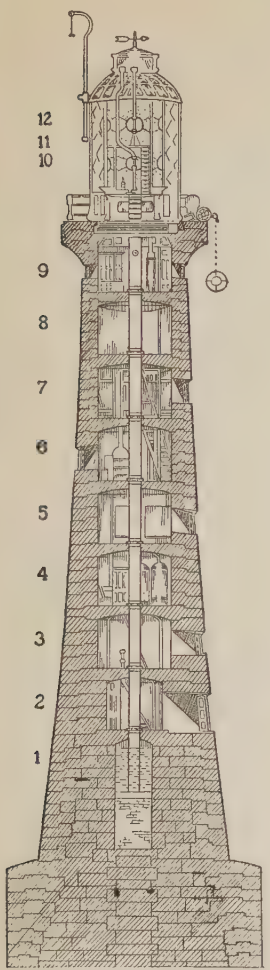
The generally accepted theory at present is that light consists of so-called electromagnetic waves in the ether, since all the fundamental experiments performed with light waves have been repeated with electromagnetic waves of relatively large wave-lengths of from 400 meters to perhaps 50 meters. Similar waves have been produced in the laboratory having wave-lengths as short as .6 centimeter. The longest heat waves so far detected have a length of .006 centimeter; the longest waves ordinarily visible as deep red have a length of .000076 centimeter, and the shortest, .000039 centimeter; ultra-violet waves as short as .00001 centimeter have been detected, especially by their chemical effects. All these various waves are transmitted through the air with practically the same speed of about 300,000 kilometers per second. Hence from the general relation that speed equals the product of wave-lengths by frequency of vibration, it is seen that the longer the wave-length the lower is the frequency of vibration. When the frequency is between the limits of 400 million million and 750 million million vibrations per second, these ether waves are called light. A very excellent discussion of the subject in popular language can be found in *Light*, by Richard C. Maclaurin, published by the Columbia University Press, New York.

Lighthall, William Douw (1857-), Canadian lawyer and writer, born in Hamilton, Ontario. He graduated at McGill University, Montreal, in 1879, and, after completing a course in law, engaged in practicing his profession in Montreal. Mr. Lighthall has become a prominent figure in Canadian life, socially, politically and in historical and literary circles, and has been called "a living example of good citizenship." A man of wide culture, refined taste and literary ability, he is the author, among other writings, of *Montreal After 250 Years, A Link in Iroquois History, Canada a Modern Nation* and *The Governance of Empire*. He also edited *Songs of the Great Dominion* and *Canadian Poems and Lays*.

Lighthouse, an elevated structure, usually in the form of a tower, bearing on the top a light to guide mariners at night. Lighthouses serve two purposes, to guide mariners into the entrance of harbors and to warn them of approach to places of danger.

Construction. On shore, lighthouses are usually located on bluffs or prominent points of land from which the light

can be seen at a great distance. But many lighthouses are located on rocks far from shore. The construction of a lighthouse, therefore, depends upon its location, and the particular purpose for which it is erected. Lighthouses on shore do not have to resist the force of waves, tides or ice, and their construction is much more simple than that of those in the open sea. Sometimes the lighthouse consists of only a wooden frame, upon which the lantern is mounted. In other places, brick, stone or steel towers are erected. Whenever the location is such that the keeper must live near his light, a house is built for his family.



LIGHTHOUSE

1, Water tank; 2, entrance room; 3, storeroom; 4 and 5, oil rooms; 6, living room; 7 bedroom; 8, storeroom; 9, service room; 10-12, light chamber and light.

The erection of lighthouses on nearly inaccessible rocks in the open sea often presents the most difficult of engineering problems. Often the foundation must be laid under water, and before this can be done the rock must be leveled. Upon this foundation is reared the tower, which is usually in the form of a truncated cone. Sloping gently towards the top, these structures have to resist the pressure of wind and sometimes of ice. They must, therefore, possess great strength. The walls are of stone or concrete, and at the base are five or six feet thick, tapering upward until at the top the thickness is about 18 inches. The stones are doweled and cemented together, so as to form one solid mass. Inside, the walls are lined with brick, and an air space is left between the wall and the lining. The interior is divided into several rooms, which serve as storerooms for supplies and living rooms for the keeper and his family. The top is surmounted by the light chamber in which the lantern is placed.

THE LIGHT. The light is the most important part of the structure. Many lights at entrances to harbors and on points on shore consist of a large lamp within a glass-enclosed chamber. When designed to throw light in only one direction, a strong concave reflector is placed back of the light. The most important lights, however, are of the revolving type. The light consists of a lamp containing several circular wicks, one within the other, so as to produce a solid frame. Surrounding the lamp is the lantern, which consists of three or more series of lenses, each series constituting a face. The series consists of a plano-convex lens (See LENS), which is placed in the center, and surrounded by a number of rings of prisms, so constructed that they reflect all rays of light striking them in parallel lines. The several series of lenses are mounted in a brass frame, which is supported on brass rollers, revolving on a horizontal, metallic plate. The motion is imparted to the apparatus by clockwork. The lantern may have from three to six faces. The largest patterns contain several thousand pieces of glass, and the light from the largest can be seen for more than 20 m. A beam of light from a revolving lantern can be seen only when the face of the lantern is directly opposite the observer; consequently all revolving lights are known as flash lights. In a single revolution, the light produces as many flashes as the lantern has faces.

A red light is produced by placing a pane of red glass in front of the face. The number of flashes, exact time of revolution to a second and the relative number of red and white flashes are all recorded, and a copy of this record is placed with every mariner navigating the waters on which the light is located.

Lightship. Sunken rocks occasionally occur in the paths of vessels where lighthouses cannot be constructed. These places are marked by lightships which are anchored to the rock. A lightship contains two masts, on each of which a light is supported at night. The living rooms for the keeper are in the hold of the vessel, which is staunch and strong to withstand the action of the waves.

Lighthouse Board. All lighthouses in the United States are under the management of the lighthouse board, which constitutes a bureau in the United States Department of Commerce. This board makes all rules for governing lighthouses and buoys, and has control over the entrances to all harbors. It purchases all supplies for the service, and maintains on the Atlantic and Pacific coasts and on the Great Lakes fleets of boats called "lighthouse tenders." These boats visit the lighthouses at frequent intervals, and take to them the necessary supplies. The entire lighthouse service is under rigid discipline, and is subject to frequent government inspection. The keeper is required to stay by his light, even if in so doing he forfeits his life. All maritime nations now maintain lighthouse systems, which have reached a high degree of perfection.

Lightning, a sudden illumination of the heavens, due to the discharge of atmospheric electricity from one cloud to another or from a cloud to the earth. There are three principal classes of lightning: (1) forked, or zigzag lightning, a line of light of intense brilliancy and irregular direction, which sometimes ramifies in branches like the limbs of a tree; (2) sheet lightning, which is without definite form and which usually appears at a considerable distance on the horizon; and (3) the so-called ball lightning, which has the appearance of a small globe of brilliant light moving along near the surface of the ground, and which generally breaks up with an explosion.

Both the earth and the air are highly charged with electricity, but the electricity of the earth and that of the air are unlike. We know that bodies similarly electrified repel, bodies differently electrified attract each other; and for this reason the electricity of the air is all the time passing to the earth and that of the earth to the air, and equilibrium is thus maintained. Because moist air is a good conductor of electricity, the evaporation which is continually going on facilitates this interchange. When, however, the air is dry the transference takes place with difficulty. When water vapor is condensed in the upper strata of the atmosphere, electrical energy is generated. As electricity resides on the surface of a body, it follows that when the minute particles of a cloud are uniting to form raindrops, their electrical potential or amount of electricity is rapidly rising. Now, when the electrical potential of a cloud becomes much higher than that of the earth or another cloud, a discharge takes place between them through the air. Dry air, as has been said, is a nonconductor, but when there is much electricity it can force its way across an interval of air; and as the resistance of the air is very great the electrical energy is converted into heat and the particles of air are set in such violent commotion that they become luminous. The white-hot air expands suddenly and then suddenly contracts, setting up a succession of air waves along the line of the flash. These reach the ear as thunder. The prolonged rumbling of thunder is due partly to echo and reverberation and partly to the fact that the sound waves along the line of discharge reach the ear at different intervals, the discharge being sometimes several miles in extent.

There is no absolute and complete

safeguard from the destructive power of lightning, though lightning conductors or lightning rods on the tops of buildings serve to equalize the potential of the earth and clouds and prevent a disruptive discharge. Danger to buildings in the open country is greater than in cities. Among forest trees the oak is oftenest struck, the beech least frequently. See CLOUD; RAIN; STORM; LIGHTNING ROD.

Lightning Rod, a device for protecting ships and buildings from damage by lightning. In its most effective form it consists of flat strips of metal, either iron, steel or copper, having their upper ends pointed and their lower ends sunk deeply into the moist earth. The intermediate points should be connected with the building, preferably to those parts containing metal, like a water pipe, cornice or roof. Glass insulators should never be used, for they do more harm than good. The chief work is not so much to protect the building which lies directly in the field of the lightning's discharge, but rather to prevent discharges by leading off and gently dissipating the lightning's powerful electrical currents. Lightning rods were suggested by Benjamin Franklin. See ELECTRICITY; FRANKLIN, BENJAMIN; LIGHTNING.

Lightship. See LIGHTHOUSE, subhead *Lightship.*

Lig'nite. See COAL, subhead *Brown Coal.*

Lig'num Vitæ, *Vī' te,* a tropical or subtropical tree of the Bean Caper Family, seven or eight species of which are known in Florida, Mexico, Central America and the northern Andean region. The bark is scaly, and the cylindrical branches are marked at intervals by swollen joints. The wood and resin are both valuable; the former, because of its hardness, is used for making pulleys, mallets, bowling balls, ship blocks and sinkers; the latter is a constituent of many medicines.

Li Hung Chang, *Lē' Hoong' Chang',* (1823-1901), a Chinese statesman. In 1864 he was associated with Charles George Gordon, known as "Chinese Gordon," in putting down the Taiping rebellion in China, and was richly rewarded for his services. While viceroy of the Province of Pechili, he showed his zeal for progress by encouraging many improvements. He negotiated treaties with various countries and began the building of a Chinese navy. During the war with Japan (1894) he was in charge of affairs and was sent to negotiate for peace in 1895. After representing China at the coronation of Nicholas II of Russia in 1896, he visited the principal nations of Europe and the United States. The highest honors were conferred upon him wherever he went. Li Hung Chang was the most enlightened and progressive Chinese statesman of his time. He started Chinese trading companies, supported the construction of railways and laid a foundation for that progress in Western civilization which is gradually securing a foothold in China.

Lilac, *Lī' lak,* a common shrub of the Olive Family, popular in dooryards and parks because of its beautiful foliage and flowers. There are many varieties, most of which grow to the height of small trees. The leaves have broad bases and fine-pointed apexes, and are a cool green color that makes a pleasing background for the white or lilac-colored blossoms. These blossoms grow in thick fragrant clusters that open in May, perfuming the air and delighting the eye. The single blossoms have tubular corollas with four spreading divisions and short, yellow stamens. The Persian lilac is a smaller shrub than the common lilac and has narrower leaves and fine feathery clusters of flowers. The common lilac is native in Hungary.

Lille, *Leel,* or **Lisle,** *Leel,* a city of northern France, capital of the Department of Nord, situated on the Deûle River, 154 m. by rail n.e. of Paris. The buildings include the Renaissance town hall, the Palace of Fine Arts, various churches, the prefecture, several museums and picture galleries. Among important industries are the spinning of flax, lace making, cotton spinning and

the manufacture of woolen fabrics, tobacco, oil, white lead, sugar, military stores and locomotives. Printing, refining saltpeter and distilling are also large industries. The trade is chiefly in raw materials, especially in wheat. The city is strongly fortified; buildings were erected on the site before 1030. Population in 1906, 196,624.

Lil'y, a name applied to a number of species of the Lily Family and to a few similar flowers of other families. Lilies are characterized by their scaly bulbs, parallel-veined leaves and six-parted flowers. In the majority of lilies the petals are recurved and the flowers nodding. They vary in color, being principally white, yellow and red. The wood lily and the southern red lily have erect blossoms. The white lily of any species is an emblem of purity. It is the national flower of Italy. The sego lily is the state flower of Utah.

Some of the most common wild and garden lilies are: tiger lily, day lily, wood lily, Canada lily, southern red lily, Turk's cap lily, red lily, Japan lily, Chinese lily and long-flowered lily. Other so-called lilies are the Atamosco and the St. James lily of the Amaryllis Family; the blackberry lily of the Iris Family; and the pond and water lilies.

Lily-of-the-Valley, a well-known and always loved plant of the Lily Family, which grows wild in rocky woods but is better known as a garden or border plant. The leaves and flower stalk grow directly from a fleshy bulb; thus the plant is practically stemless. The leaves are smooth, light green in color, and have broad, pointed blades. The flower stems are exceedingly slender and bear a row of nodding, bell-like flowers, delicate in appearance and of delicate fragrance. As the lily is the emblem of purity, the lily-of-the-valley is the emblem of youthful purity and innocence.

Lima, *Le' mah,* the capital of Peru, situated on the left bank of the Rimac River, 7 m. from Callao. The streets are paved with cobblestones; among the pleasure resorts of the city are the public gardens and the Paseo Colon, with its long drives, paths and statues and shrubbery. The finest statues in Lima are those of Columbus, Bolivar and Bolognesi. The public buildings and institutions include the Exposition Palace, the National Library, the University of San Marcos, the Cathedral begun in 1535, several churches, convents and technical schools. Within recent years the manufacturing interests have developed rapidly, and cotton and woolen textiles, cottonseed oil, chocolate, cocaine, macaroni, soap and candles are produced. The city was founded in 1535 by Pizarro, capitulating to the Chileans in 1881. During the two years that the invaders occupied Lima, all the public buildings were ravished and the city suffered an irreparable loss of art treasures, books and apparatus of the technical schools. The inhabitants are to a large extent of negro descent or of foreign birth. Population in 1906, estimated at 140,000.

Li'ma, Ohio, a city and county seat of Allen Co., 71 m. n. of Dayton and 72 m. s.w. of Toledo, on the Ottawa River and on the Pennsylvania, the Erie, the Lake Erie & Western, the Detroit, Toledo & Ironton and the Cincinnati, Hamilton & Dayton railroads. Lima is known as an interurban as well as a railroad center, having excellent electric service by six lines to Dayton, Findlay, Cleveland, Toledo, Columbus and Fort Wayne, Ind. Oil refining is one of the principal industries. Lima has an area of over six square miles and has broad paved streets and avenues and well-kept lawns. There are many substantial homes and handsome residences. Faurot and Lincoln are the largest of the city parks. Other semipublic parks include Hoovers, McBeth's, McCullough's and the Lima Driving Park, said to have the best one-half mile driving track in the state, and known as the "Lexington of Ohio."

Among the principal buildings are the Allen County Courthouse, Masonic Temple, the Metropolitan and Holland blocks, Allen County Memorial Building, Y. M. C. A. Building, the Lima Club, Elks' Home, city building, Faurot Opera

House, a number of fine hotels, six banks and about 35 churches. The educational institutions include a high school, a public library, 11 ward schools, St. Rose and St. John's parish schools and Lima Business College. There is a well-equipped city hospital; the Lima Hospital and the Ohio State Asylum for the criminal insane adjoin the city on the north, and the Tuberculosis Hospital adjoins it on the west.

There are numerous oil wells in the vicinity, and crude oil and gas are also piped in from Western States. The important manufacturing industries include extensive locomotive and car works, structural-iron and bridge works, lubricating-oil works and manufactories of awnings and fixtures, cement blocks, bed springs, electrical motors and supplies, galvanized-iron cornices, harness, horseshoes, nitroglycerin, oil-well tools, paints, soda sirups, tile roofing, steel oil cars and other diversified products. There is a wholesale trade in petroleum, farm and dairy products. Large repair shops of two railroads are located here. The city owns and operates the waterworks.

Lima was laid out as a town in 1831 and first organized as a city under a general state law in 1842. Population in 1910, 30,508. In 1920, 41,306.

Lime, a small tree closely resembling the lemon and belonging to the same genus of the Rue Family, and sometimes classed as a variety of lemon. Its branches are crooked and spreading, its leaves more rounding than those of the lemon and its fruit more nearly spherical. The tree itself is hardier than most citrons; hence it is found in wider areas. In the United States it is grown in the Southern and the Western states, and in Mexico is a common tree. The fruit is put to the same use as the lemon, but less commonly on account of the sharpness of its juice. The linden, a tree of the Linden Family, is sometimes called the lime tree, more frequently in Europe than in the United States. In the South the tupelo, or sour-gum tree, of the Dogwood Family, is also called the lime, probably on account of its sour fruit.

Lime, the oxide of the metallic element calcium and known in chemistry as one of the alkaline earths. When pure, lime is white and does not fuse, except by the intense heat of the electric furnace. It is obtained pure by heating Iceland spar (calcium carbonate) to bright redness, when the carbon dioxide is driven off and lime is left.

QUICKLIME. Quicklime, the lime of commerce, is produced by burning limestone or marble in kilns. When water is poured on it, it swells and great heat is produced, leaving a light, white powder or a moist mass, depending upon the amount of water used. This is hydrate of lime, or slaked lime. On exposure to the air for a long time, quicklime takes up moisture and carbon dioxide and becomes air-slaked.

Lime is used in the making of mortars, cements and paper pulp, for purifying illuminating gas, for removing hair from hides previous to tanning, for sterilizing the soil and in the manufacture of glass. Lime, as a phosphate, constitutes the principal part of the earthy material in the bones of animals and is also found in the ashes of all plants. In various combinations, lime is diffused throughout the earth and is contained in many natural waters, and is the chief cause of the hardness of these waters. See LIMESTONE.

Lime Light, or **Ox"yhy'drogen Light,** a very brilliant, white light produced when oxygen and hydrogen are mixed and ignited, and the flame is directed upon a solid piece of lime. It is commonly used in theaters and in magic-lantern work for illuminating purposes. A steel cylinder containing oxygen under pressure and one containing hydrogen or illuminating gas supply a burner in which is held the lime, which is heated to a white heat and produces the light. These are called by theatrical people calcium or lime lights, as lime is oxide of calcium. Electric lights with powerful reflectors have superseded them where the electric current is available. See HYDROGEN; OXYGEN; CALCIUM; ELECTRICITY; STEREOPTICON.

Limestone, the general term applied to rocks which are composed of carbonate of lime and sometimes of carbonate of magnesia. In texture it varies from coarse to fine, the several grades being magnesian, clayey, sandy and crystalline (marble). Important varieties are compact, foliated, granular, calcareous, peastone and statuary limestone. The color varies from pure white to black. Iceland spar is one of the purest varieties. Limestone is used extensively in building, as a flux in smelting iron ore and in the manufacture of glass. Hydraulic limestone is an aluminous variety having the property of hardening under water after it has been baked. It is widely used in the manufacture of cement for paving and other purposes. See MARBLE.

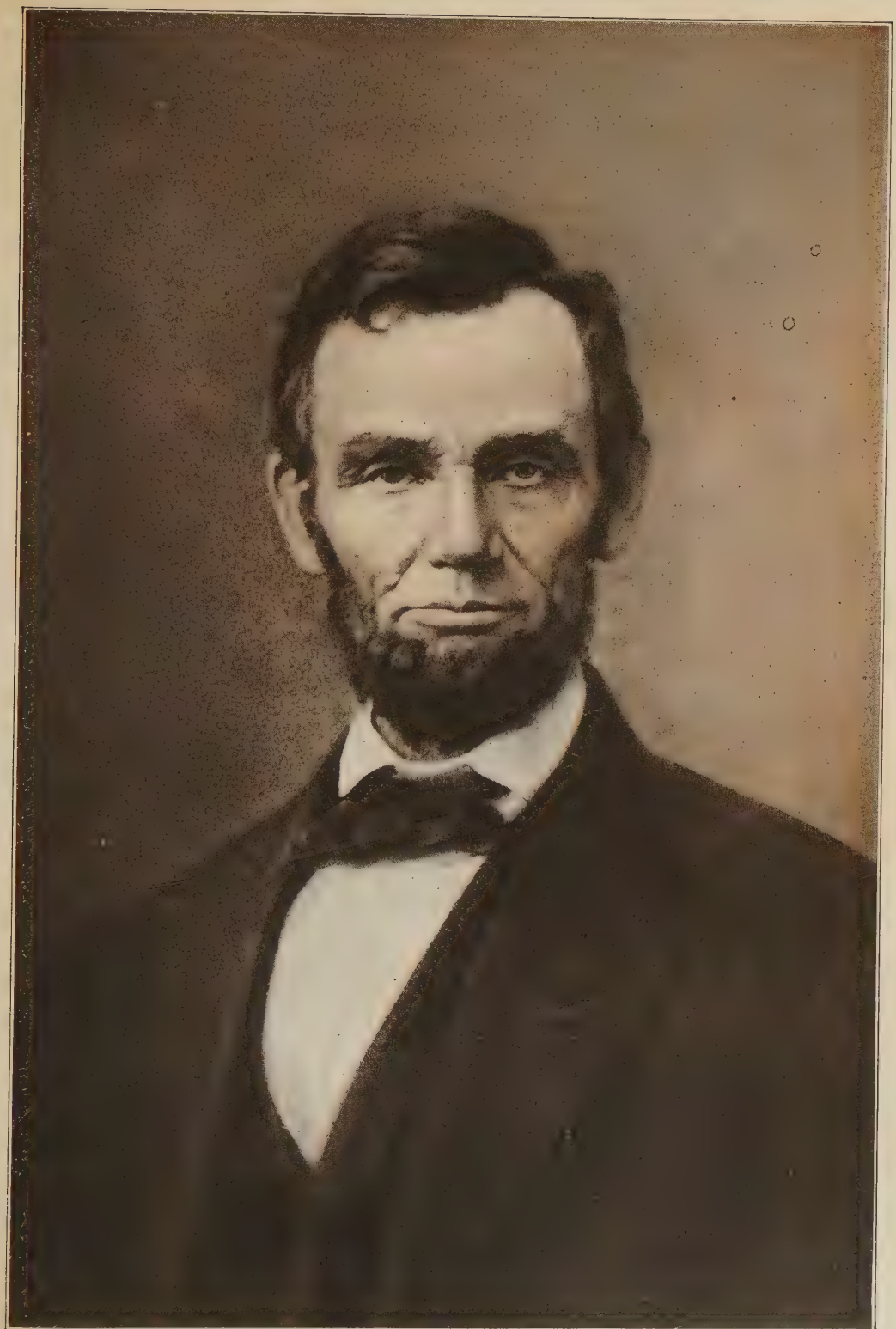
Li'monite, an important ore of iron occurring in the form of rounded masses, the chief varieties of which are brown hematite and bog iron ore. It is moderately hard, somewhat brittle, brown in color and opaque. It is found in Europe and parts of Great Britain; and it occurs in great abundance in the United States, rich and valuable deposits being found in Virginia and Alabama. See IRON AND STEEL.

Lim'pet, a name given to a number of families of Mollusks which are of wide distribution. The European limpets are small and have spreading conical shells. They fasten themselves to rocks between high- and low-tide lines and depend upon the waves to bring them their food. The keyhole and bonnet limpets are smaller and coarser and are not valued as food. They are used to a slight extent as bait for lobster pots and fishing floats.

Limpo'po, a river in the eastern part of South Africa. It rises in the Transvaal Province, west of Pretoria, flows northwest, and, after receiving the Marico and forming the boundary between the Transvaal Province and Bechuanaland Protectorate and Southern Rhodesia, it flows southeast and empties into the Indian Ocean through Delagoa Bay. The total length is 1000 m., but only a small part of it is navigable, and its commercial importance is slight.

Lincoln, Abraham (1809-1865), sixteenth president of the United States and one of the world's greatest statesmen. He was born in Hardin County, Ky., Feb. 12, 1809. His father, Samuel Lincoln, came to Massachusetts from England in 1637 and settled at Salem. The descendants moved to Pennsylvania and then to Virginia, where they were recognized as people of good family and considerable property. Abraham's grandfather, Abraham Lincoln, sold his Virginia property and moved to Kentucky about 1780, settling near his friend and kinsman, Daniel Boone. Abraham's father, however, Thomas Lincoln, was a roving, shiftless man, unable to read and hardly able to write his name. He married Nancy Hanks, a vivacious woman of good character but humble family. The cabin to which Thomas Lincoln took his young wife was built of logs, and contained but a single room, with a packed dirt floor, a window without glass, and a doorway without a door. There was a pole bedstead in one corner, blocks of wood served for chairs, and a split log on pole legs for a table. The fireplace was built of sticks and stones plastered with clay. In this cabin Abraham Lincoln was born, a fine, strong, healthy child. Under such conditions he had little chance for an education and, in fact, attended school less than a year in all his life, but his mother taught him to read, and he early became extremely fond of books.

BOYHOOD AND YOUTH. In 1816, when Abraham was seven years old, the family moved to Indiana, where the first winter was passed in a "half-faced camp," a shed built of logs, enclosed on three sides and open on the fourth. The next year a log cabin was built, and three-legged stools in place of blocks were considered a great improvement in the furniture. Abraham slept in an attic loft, to which he climbed by means of wooden pegs in the wall. In this new country and under such primitive conditions the boy grew to manhood, living



ABRAHAM LINCOLN

in the out-of-doors, helping on the farm, eking out the family income by working for neighbors at 25 cents a day, reading every book on which he could lay his hands, and coming to be recognized as the strongest, keenest, brainiest, wittiest lad in the entire countryside.

In 1818, when he was nine years old, his mother died, and the following year his father married Sarah Johnson, a capable widow who was fond of her stepson and materially aided his development. She brought to the home a little property, which added to its comfort, while her energy and thrift did much to better conditions. Later in life Lincoln paid grateful tribute to his mother and his stepmother for their influence in molding his character. The books which he had were few, but these he read and reread until they became a part of his very life. They included the Bible, *Æsop's Fables, Robinson Crusoe, The Pilgrim's Progress,* Weem's *Life of Washington* and a history of the United States; and probably Shakespeare, Burns and the lives of Henry Clay and Benjamin Franklin,—a choice library, if a limited one. He sometimes walked several miles to borrow a book. He gained knowledge of arithmetic by ciphering on a wooden shovel with a piece of charcoal, whittling off the surface of the shovel when it became covered with figures. He also acquired an elementary knowledge of grammar and the rudiments of surveying.

In 1830 his father again moved, going on into Illinois where he settled in Macon County, on the banks of the Sangamon. Abraham, now a young man of 21 years, six feet and four inches tall, lanky, strong and muscular, remained at home long enough to assist in building a house and to break 15 acres of land and split rails to fence it. He then started out for himself. He made two trips to New Orleans in a flatboat, where he learned to abominate slavery. He became clerk in a general merchandise store, enlisted in the Black Hawk War, and finally engaged in business with a worthless partner. The firm failed, and Lincoln was

forced to years of economy to pay the debts. He now engaged in the study of law, supporting himself by acting as deputy county surveyor and postmaster of New Salem.

Early Public Life. Lincoln early became interested in politics. He was an unsuccessful candidate for the State Legislature in 1832, but was elected in 1834 and served for eight years, taking rank among the leading members from the first. After entering the Legislature he did not return to New Salem, but was admitted to the bar and formed a law partnership in 1837 at the state capital, where he gradually built up a good practice. In 1842 he married Miss Mary Todd, a young Kentucky woman of good family whom he met while she was visiting friends in Springfield. He was elected to the House of Representatives in 1846, but was not a candidate for re-election.

He had now become the most influential exponent of Whig principles in Illinois, and was much in demand; but he gave his attention chiefly to his practice, and attained a commanding position at the bar. The passage of the Kansas-Nebraska Bill and repeal of the Missouri Compromise in 1854 aroused his political ardor once more, and he began in earnest the contest against the extension of slavery. He was a candidate for United States senator in 1854, but withdrew in favor of Lyman Trumbull. In 1858 he was again a candidate, in opposition to Stephen A. Douglas, the Democratic incumbent. In the ensuing campaign the two candidates engaged in the famous series of debates that made of Lincoln a national figure. His presentation of what had come to be the great national issue was so clean-cut, logical, comprehensive and fearless, at the same time expressed in a style so simple, direct and earnest, that it was evident a new statesman and orator of unusual ability had entered the political arena.

Election to the Presidency. Lincoln was defeated for the Senate by Douglas, but this did not disturb him; he was contending for a great principle,

not merely for a senatorial appointment. The impression made by his debates was deepened by his remarkable Cooper Institute speech in New York City early in 1860, followed by speeches throughout New England, in which he appealed powerfully to the intellectual convictions and moral conscience of the entire North. When the Republican National Convention met in Chicago in 1860 he was the logical candidate for president, and was nominated on the third ballot. The Democratic Party was divided between two candidates, Stephen A. Douglas and John C. Breckinridge, and Lincoln was victorious in the fall elections. Although he had made the statement that he did not propose to interfere with slavery where it already existed, yet excitement in the South rose to fever heat at his election, which was the signal for secession in South Carolina, followed by similar action in others of the Southern States. The conciliatory attitude of the new President in his inaugural address of March 4, 1861, could not stay the rising tide of secession, and war was made inevitable by the bombardment of Ft. Sumter on April 13.

The Civil War. During the bitter and bloody contest of the next four years Lincoln bore upon his great heart the burden of both North and South, the sorrow of mourning wives and mothers, the horrors of the slain and wounded, the perplexing conduct of the war, the responsibilities of State, until seams of care lined his cheeks and aged his benignant face. Practically an untried man when he came to the presidency in the greatest crisis the nation ever faced, his firmness, sagacity, determination, generosity, sympathy and intellectual power were increasingly demonstrated as the war progressed. First of all, his purpose was to preserve the Union intact, and, next, to prevent the further extension of slavery. He had no intention of abolishing slavery unless as a necessary war measure. Such an emergency finally arose, in his judgment, and on Sept. 22, 1862, he issued a preliminary proclamation to the effect that in all states or parts of states still in rebellion on Jan. 1, 1863, the slaves should be forever free; and on the latter date he issued the final Emancipation Proclamation freeing the slaves in the designated territory.

In the midst of the struggle Lincoln was unanimously nominated by the Republican Party for a second term, and, although the issue was for a time in doubt, he was elected by a safe majority in the fall of 1864. His second inaugural address is one of the world's remarkable State papers, rising to the highest level of true oratory and laying bare the animating purpose of a great man. Soon after the inauguration the broken and exhausted remnant of Lee's great army surrendered to Grant at Appomattox Courthouse, and a few days later Johnston surrendered to Sherman. The Civil War was ended.

Death of Lincoln. In the midst of the universal rejoicing the nation was plunged into deepest gloom by the assassination of President Lincoln at Ford's Theater on the evening of April 14. He died the next morning. The funeral was unparalleled in popular demonstrations of affection and grief. Throughout the long journey from Washington, by way of New York and Albany, to Springfield, Ill., where the body was interred, thousands of people viewed the remains in silent sorrow. European rulers and statesmen united in paying tribute to one who had come to be recognized as a great man and ruler. Even the leaders of the South felt the magnanimity of his spirit, and joined in respectful regret at his death, feeling prophetically, perhaps, the tragic fate that removed from action the man who had forced the South back into the Union, who understood it and sympathized with it, and who was best fitted to heal the wounds of the war.

Estimate of Lincoln. An imposing monument has been erected to Lincoln's memory in the beautiful cemetery at Springfield; but his position is so secure in the hearts of men that no monument, however imposing, can add to his renown. Coming of humble parentage,

reared amid hardships and privations, without social prestige or influential friends, he forced his way to the highest pinnacle of fame by sheer intellectual power, animated by a mighty purpose and consecrated to a great cause. He was a statesman of the first order, with the ability to analyze a complex situation and put his finger on the heart of the issue, unconfused by incidentals; and having determined the main issue, to abide by it, unmoved by circumstances. He was a great orator. His debate with Douglas, his speech at Cooper Institute, his address at Gettysburg, his second inaugural address,—these have never been surpassed in their respective fields for greatness of thought, simplicity and purity of diction, earnestness of purpose and wealth of sympathy. He was one of the world's great men, great in intellect and in heart, in purpose and in sacrifice, in endeavor and in achievement. The tragedy of his death only added to the glory of his life, and the passing years have established his high position on the world's roll of honor.

He knew to bide his time,
And can his fame abide,
Still patient in his simple faith sublime,
Till the wise years decide.
Great captains, with their guns and drums,
Disturb our judgment for the hour,
But at last silence comes;
These all are gone, and standing like a tower,
Our children shall behold his fame,
The kindly, earnest, brave, foreseeing man,
Sagacious, patient, dreading praise, not blame,
New birth of our new soil, the first American.—Lowell, *Commemoration Ode.*

Lincoln, Benjamin (1733-1810), a prominent American soldier of the Revolution, born at Hingham, Mass. At the outbreak of the Revolution he helped organize the Continental army, and in 1776 became major-general of the Massachusetts troops. He was given a command at the siege of Boston and at White Plains and reinforced Washington at Morristown. In February, 1777, he was commissioned major-general in the Continental army, and was second in command to Gates in the Saratoga campaign. On Oct. 8 he was wounded and lamed for life, but resumed service the following August, when he superseded Gen. Robert Howe in the South. Lincoln recaptured Augusta, but suffered defeat at Brier Creek, Savannah and at Charleston, which, with 3000 prisoners of war, he was obliged to surrender May 12, 1780. He was exchanged in the spring of 1781 and received Cornwallis's sword at the surrender of Yorktown. He was secretary of war, 1781-1783, and he commanded the Massachusetts militia during Shays's Rebellion. In 1789 he became collector of the port of Boston.

Lincoln, Ill., a city and county seat of Logan Co., 28 m. n.e. of Springfield, on the Illinois Central, the Chicago & Alton and other railroads. The town is surrounded by coal fields and is engaged in mining. Other industries include the manufacture of horse collars, mattresses, caskets, excelsior, cellulose and flour. The principal institutions are Lincoln University (Cumberland Presbyterian), the Illinois State Institution for Feeble-Minded Children, the Odd Fellows' Orphans' Home, St. Clara's Hospital and the Deaconess Home and Hospital. Among the attractions of the town are a Carnegie library building and an old courthouse, in which Lincoln practiced as a lawyer. Settled in 1835, Lincoln received its charter in 1857. Population in 1920, U. S. census, 11,882.

Lincoln, Neb., the capital of the state and the county seat of Lancaster Co., on Salt Creek, 55 m. s.w. of Omaha, and on the Union Pacific, the Chicago, Rock Island & Pacific, the Missouri Pacific, the Chicago & North Western and the Burlington railroads. Lincoln is situated in the midst of rolling prairie land of great beauty and of great agricultural value. It has wide, attractive avenues, beautiful homes and pleasant parks. There are many public buildings of pleasing style; among these may be mentioned the state capitol, a city hall, the Federal Building, the county courthouse, St. Elizabeth's Hospital and Home for the Friendless, a Carnegie library and the new Lincoln Commercial Club Building.

In the city or its environs are located

the University of Nebraska, the Nebraska Agricultural College, the Nebraska Wesleyan University, Cotner University and Union College, the last three of which are denominational schools. The student population for 1919 is 8000, and in addition 10,941 pupils were enrolled in the public schools. Aside from its Carnegie library, Lincoln has exceptional advantages in its university library, the state library and a state historical library. The state penitentiary and a state asylum for the insane are located in the suburbs, as are also the State Fair Grounds, where large annual state fairs are held. Being centrally located and upon many great railroad lines, Lincoln is an important commercial city. There are about 120 manufacturing plants in Lincoln, representing more than 150 different kinds of industries, whose output for 1919 was valued at $30,000,000. There are 150 jobbing houses, whose sales for 1919 amounted to $65,000,000. The manufacturing establishments produce mattresses, flour, brooms, paints, saddles and harness, overalls and shirts, sash and doors, brick and creamery products, gasoline engines, silos and many other articles. The largest individual creamery in the world is located in Lincoln. The limestone quarries yield excellent building stone and a variety of clay supplies local and domestic potteries.

Lincoln was originally settled because of its salt wells, which failed to live up to their early promise. Its first name was Lancaster, but when it became the state capital in 1867, the name was changed to Lincoln, since which time it has been a thriving city. Within a radius of five miles from the post office there reside 65,000 people. Population in 1920, U. S. census, 54,934.

Lind, Jenny (1820-1887), the celebrated Swedish soprano, born at Stockholm, the daughter of a lace manufacturer. She first appeared professsionally in Berlin in 1844, singing the leading soprano rôle in *Norma,* and subsequently she appeared in all the other German music centers, taking leading parts in all the principal Italian operas. In 1847 she visited England, where she was received with great enthusiasm, and three years later came to America. In 1852 she married Otto Goldschmidt, the composer, thereafter living in England. She died at Malvern Wells. To the exquisite natural purity of her voice were added a refined musical taste and a thorough understanding of the theory of her art. She possessed a rare combination of secondary gifts—beauty, ability as an actress, and a vital personality—which united to produce such a high degree of artistic merit as has never been surpassed. Sacred parts she sang with great religious fervor, and in their depth and grandeur they bore comparison with her operatic rôles.

Lind'sey, Benajmin Barr 1869-), an American judge and reformer, born in Jackson, Tenn. He was admitted to the bar in 1894 and seven years later became judge of the County Court and Juvenile Court of Denver. Judge Lindsey, who is an international authority upon juvenile delinquency, is responsible for the Colorado Juvenile Court Law and for the passing by the Colorado Legislature of the first contributory delinquency law against adults. In 1912 he became actively connected with Theodore Roosevelt in the organization of the Progressive Party. He has written *Problems of the Children, The Beast and the Jungle* and *The Rule of Plutocracy in Colorado.*

Lin'en, cloth made from the fiber of flax. Linen is one of the earliest used of any variety of cloth. The ancient Egyptians used it to wrap their mummies in and for official garments for the priests. Linen is frequently mentioned in the Bible; it was worn by the Greeks and Romans and has been a common fabric throughout Europe for centuries. The fiber of flax can be spun into a very fine thread; hence the most delicate fabrics, such as lawns, are made of linen. France, Belgium, Netherlands and Ireland are the leading countries in the manufacture of linen goods. The finer fabrics are used chiefly for table spreads and napkins and dress goods, and the

coarser varieties are used for towels and sometimes for bed linen. Some textiles contain a cotton warp and a linen woof. Linen thread is extensively used in the manufacture of lace. The value of linen consists in its uniform texture, its beauty of finish and its durability. See FLAX.

Linnæus, *Li ne' us,* **Carolus,** or **Linné,** *Lin' na,* **Karl von** (1707-1778), a Swedish naturalist and a botanist of the first rank. From his earliest years his tastes ran to the cultivation, study and collection of plants, and through the kindly direction of his early schoolmasters he was led along scientific lines. Later he continued his study at the University of Upsala, where he soon became director of the botanical garden, going from there to Netherlands for his medical degree. He became professor of medicine in the University of Upsala in 1741, a position which he soon exchanged for that of his friend Dr. Rosen, head of the botanical department. In this capacity Linnæus spent 37 profitable years, teaching, studying and carrying on original investigations. Students flocked to his lectures, and separating later, sent him specimens and data from all parts of the world, thus making his work and his collection unique and unsurpassed. For about ten years before his death his memory began to fail and his work became consequently less.

Linnæus laid the foundation for the study of modern botany, and his systems of plant nomenclature and of classification, though not followed today, were the means of systematizing all botanical study and paving the way for present methods. His descriptions were brief and accurate and his observations keen, thus making his work of lasting value.

Lin'net, a small bird of the Eastern Hemisphere, belonging to the Finch Family. Its plumage varies so greatly in different seasons, at different ages and for the different sexes, that it is difficult to recognize it at all times. Probably its most noticeable colors are those adopted by the male during the summer. Its plumage is then a rich brown, with head, neck and breast crimson and under parts creamy white. In the United States the house finch is sometimes called the linnet.

Lino'leum, a floor cloth made of linseed oil, cement and ground cork. The linseed oil is so treated that it becomes a solid, spongy mass. Rosin and kauri gum are then added and the compound is thoroughly mixed. If a plain linoleum is desired, the coloring matter is also added at this time. The ground cork is then added, and the mixture is spread upon a jute burlap and passed between rollers, which press it into the burlap and give it a uniform thickness and smooth surface. Figured linoleum is made by stamping the figures upon the surface, or by building the design with different colored cements.

Linotype, *Line' o type".* See TYPESETTING MACHINE, subhead *The Linotype.*

Lin'seed Oil, the oil made from the seed of flax by bruising, crushing and then by pressing. The crushed mass is sometimes steamed before being pressed, but the cold-pressed oil is better, as it is less likely to become rancid than the steam-pressed. When pure, linseed oil is colorless and has a disagreeable odor and taste. It is sold either as boiled or drying oil or as raw oil. The boiled oil contains a small quantity of oxide of lead, which causes it to dry quickly. It is generally used in paints and varnishes. The oil cake that is left after the oil has been pressed out makes a good food for cattle and poultry. See PAINT; VARNISH.

Lion, *Li' un,* one of the largest members of the Cat Family, particularly distinguished for its majestic appearance and for its fearful roar, probably the loudest made by any animal. No two lions are of the same color, but, in general, they are gray or tawny, and the kittens are marked with darker spots, which disappear after about six months. The face of the lion is calm and dignified when he is not aroused by anger or hunger. The body is from four to six feet long and, in the male, is surmounted by a heavy mane, varying in length in different individuals and giving

the body a singularly top-heavy appearance. The tufted tail is about one-half the length of the body and its furious lashing is a sign of great anger on the part of the king of beasts.

The haunt of the lion is a dense thicket or thorn-protected cavern where he is reputed to care for his family with great affection. Stories concerning him, however, are rather conflicting, and it is safe to say only that his actions can never be definitely foretold. Tales of his courage, his defense of his home, his refusal of any but freshly-killed food, are all met by equally stoutly maintained stories of his cowardice, his faithlessness and greed. Ordinarily, no doubt, he is satisfied to make a meal of the almost defenseless grazing animals of the jungle or clearing, but if pressed by hunger or emboldened by success, he does not hesitate to attack the elephant, rhinoceros or even the stockade-protected camps of man.

The lion lives to an age of between 30 and 40 years, a much shorter period than the life of the elephant but longer than that of most wild creatures of the jungle. Its whole life is marked by conflicts with rivals of its own race, enemies in the jungle, and man. When satisfied by a good meal and sure of its unassailable position, the lion is peaceable and not to be feared as an attacking enemy. In attack, however, it is swift and cautious in approach, sure in its spring and strong to carry away its prey. The larger specimens are three feet high and measure nine feet in length, but such dimensions are unusual.

Lions were once abundant in Africa and India, but in the advancement of exploration and colonization, their extermination is a necessity. They were formerly hunted by elephant-mounted parties, but as they have become more scarce and more nocturnal in habit, the hunters seek them either on foot or horseback by night, or lie in wait for them by the springs which are the scenes of their most common depredations.

Lipari, *Lip' a ree,* **Islands,** a group of small islands north of Sicily in the Mediterranean Sea. The group includes Lipari, the largest of the group, Salina, Vulcano, Filicuri, Stromboli, Panaria and Alicuri and a few islets. The islands are of volcanic origin and embrace a total area of about 455 sq. m. Notwithstanding their volcanic nature, scarcity of water and irregular surface, the islands are, as a rule, productive agriculturally, their products including wines and numerous Southern fruits. The climate is mild and healthful. Stromboli and Vulcano contain active volcanoes, the former having been the scene of an eruption in 1912.

Lippi, *Leep' pe,* **Fra Filippo** (about 1406-1469), one of the most noted Italian painters of the 15th century, the formative period of Italian art. Like those of all other artists of his time, his subjects were of a religious nature, and in the handling of them he showed the influence of his teacher, Masaccio. His work shows gentleness and sympathy in treatment and his color is soft and clear. His son Filippino Lippi also became distinguished as a painter. Among Fra Filippo's best paintings are *The Coronation of the Virgin,* now in the Florentine Academy; and *Vision of St. Bernard,* in the National Gallery, London.

Liquid Air. When the temperature of air is lowered to 220° below zero F. and it is then subjected to a pressure of 585 lb. to the square inch, it is changed to a liquid. C. E. Tripler of New York constructed apparatus and made many experiments showing the uses of liquid air, but they must be regarded as only curiosities, for the reason that it requires too much expenditure of power to produce liquid air in quantities. Liquid air absorbs heat rapidly from certain objects and boils violently until it evaporates, the nitrogen going off more quickly than the oxygen. All substances immersed in liquid air are instantly frozen. It is so much colder than ice that it boils rapidly when a can of it is set upon a cake of ice

Lisbon, *Liz' bun,* the capital and principal seaport of Portugal, situated on the

bank of the Tagus River, about 7 m. from the ocean. Built in a succession of terraces up the sides of the hills at the foot of the mountains of Cintra, the city presents an appearance of beauty almost equal to that of Naples or Constantinople. The old Moorish citadel, the royal palace and the churches with their heavy ornaments, mosaics and towers, add to its picturesqueness. The fishing industry is important both because of its variety and size. The manufactures include pottery, cotton, wool, silk, paper, chemicals and tobacco. The shipbuilding industry is growing in importance. Tourist traffic from Germany and England constantly increases. In 1755 the greater part of Lisbon was destroyed by an earthquake and by the accompanying tidal wave and fire. Population in 1900, 356,009.

Lisle, *Leel.* See LILLE.

Lis'ter, Sir Joseph, BARON (1827-1912), an eminent English surgeon, the originator of modern antiseptic surgery, born at Upton, Essex. He took his medical degree at the University of London. After studies in Edinburgh in 1856, he became assistant surgeon and lecturer in that university, and in 1860 was made professor of surgery at Glasgow. He was successively professor of clinical surgery at Edinburgh, at King's College Hospital, London, and surgeon to the Queen. Lister made many important observations concerning blood coagulation and inflammation, but his greatest contribution to science was his application of the principles of antiseptics to the treatment of wounds. Previous to his discoveries, the most trivial operations often resulted in death, due to infection of the wound. His discovery that putrefaction in wounds is caused by bacteria introduced into the wound from the outside; that putrefaction might be prevented by keeping the wound free from germs; and that this might be accomplished by some germicide, such as carbolic acid, which would destroy the bacillus, laid the foundation of the principles of modern surgical practice. Lister was the recipient of many honors, and in 1897 was made a peer. Among his publications were *A Contribution to the Germ Theory of Putrefaction and Other Fermentative Changes* and *Effects of the Antiseptic System of Treatment upon the Salubrity of a Surgical Hospital.*

Liszt, *List,* **Franz** (1811-1886), an eminent Hungarian pianist and composer. At the age of six he began the study of music and soon attracted the attention of certain noblemen, who provided for his further education at Vienna and Paris. He acquired an extraordinary technique, which was reinforced by rare interpretative insight and subtlety of expression; and his pianoforte performances were marvelous. In 1848 Liszt became director of the Court Theater at Weimar, where he introduced the works of Schumann and Berlioz and also of Richard Wagner, who became his son-in-law. He retired to Rome in 1861 and joined the Franciscan Order of priesthood. Not only as a pianist was he distinguished, but also as a teacher, music critic and composer for piano and for orchestra. Among his published writings are a *Life of Chopin* and *Gypsies and Their Music.* His best-known compositions are the *Hungarian Rhapsodies* for piano.

Liter, *Le' ter.* See METRIC SYSTEM.

Literature, the term applied in a general sense to the written productions of a language or people, but often restricted to those productions which have enduring or artistic value. The province of literature is to record human thought, achievement and feeling, and it is universal in scope. The purpose of this article is to trace the progress of literature from its sources to its present proud position among the fine arts, from the period when the only written records were those engraved on stone or inscribed on clay tablets, down to the present age of the printing press.

The majority of readers are interested chiefly in what has been written in approximately modern times. It is true that the busy man and woman of today have not time to make a thorough study

of the writings of the ancients, but by acquiring some knowledge of literary achievements in the past ages they will gain a keener appreciation of the literature of modern times. The story or poem that we delight in today is not a spontaneous production unaccounted for by any reference to the past. Literature has developed by stepping stones, and each age has contributed something to the progress of the next; hence a brief review of the universal literature will be an aid in the study of the literature that appeals to the reader of today.

Ancient Literature of the Oriental Nations (4000 B. C.-1 A. D.)

Babylonia and Assyria. Recent excavations in the Euphrates Valley have brought to our knowledge the ancient literature of the Babylonians and Assyrians, whose written language is probably the oldest of which we have any record. Thousands of clay tablets have been excavated in that locality, on which are inscribed the peculiar wedge-shaped letters used by those peoples. The oldest of these tablets contain texts on mathematics, astronomy, medicine, history, language and religion, arranged and classified according to subjects. Inscriptions on stones have also been found, which give us valuable information about the early history of this region. One of these inscriptions is the oldest code of laws known to us, which Hammurabi, King of Babylon, had engraved on a stone pillar about 2200 B. C. In the seventh century B. C. Assyrian literature reached its highest point. Among the interesting relics of this period are hymns to the gods, some of which are similar to the psalms of the Old Testament, and two mythological poems, *The Deluge* and *The Descent of Istar into Hades*. See Cuneiform Inscriptions.

Egypt. The literature of ancient Egypt consists of inscriptions painted or engraved on obelisks and on the walls of temples and tombs, and of written manuscripts on papyrus. After the discovery of the Rosetta Stone in 1799, scholars were able to decipher the ancient Egyptian writing and to give to the world the translation of some of this remote literature. Previous to 3000 B. C. there were many inscriptions of a religious, biographical or historical nature, but most of these are not of literary interest. After 3000 B. C. there was great literary development. Inscriptions of every kind, historical, mythological and funereal, were made, and papyri in great numbers have survived. The Egyptians excelled all other Oriental peoples of antiquity in the narration of stories, and some of the papyri were collections of tales. One story, entitled *The Tale of Two Brothers,* contains the germ of our popular fairy tale, *Cinderella.* From a literary point of view the most important works of the ancient Egyptians are two epics, *Pentaur* and *Mohan.* Other forms of their literature are letters and fables. See Rosetta Stone; Papyrus; Hieroglyphics; Karnak, The Temple of.

China. Chinese literature is remarkable for its continuity, accuracy, variety and high moral tone. The oldest writings in existence refer to still earlier works which have not survived. The earliest gathering together of the Chinese literature occurred in the sixth century B. C., when Confucius compiled a famous group of writings consisting of five classical books. These contain the oldest monuments of Chinese poetry, history, philosophy and jurisprudence, which Confucius collected from various sources. This compilation has exerted a marvelous influence on Chinese manners, morals and customs down to our own time, and it constitutes the Chinese bible. Another important group of writings, the *Four Books,* was written by pupils and followers of Confucius. The ancient writings of the Chinese are more important for their influence on the people than for their literary quality. See Confucius.

The Hebrews. The literature of the Hebrews which we call the Old Testament has had a greater influence on the human race than any other book. Its fundamental idea, monotheism, or belief

in one God, has persisted through all the years of Jewish history. The earliest beginnings of Hebrew literature are thought to be poetical. The opening phrases of the song of Moses in *Exodus xv,* the song of Deborah in *Judges v,* David's elegy over Saul and Jonathan, and other poetical portions of the Old Testament are probably older than the narratives in which they occur. The Old Testament covers a period of 900 years, dating from about the tenth century B. C. Authorities differ as to the order in which the different books were written. See BIBLE, subhead *The Old Testament.*

INDIA. The ancient literature of the Hindus may be divided into two periods, the Vedic and the Sanskrit. The literature of the first period is sacred and dates from about 1500 B. C., when the Aryan tribes who spoke the Sanskrit language emigrated to the northwestern portion of the Indian Peninsula. In this age were composed the prayers, hymns and precepts which were later collected in the form of the Vedas, the sacred books of the Hindus. The Vedas were written in poetry, in the most ancient form of the Sanskrit, and probably date from the 11th century B. C. In the next period the people penetrated into the valleys between the Indus and Ganges rivers and began a literature written in classical Sanskrit. Two great epics belong to this period, the *Mahabharata* and the *Ramayana.* These epics are the most important creations of Hindu literature, surpassing in magnitude the *Iliad* and the *Odyssey.* The Hindus also wrote lyric and dramatic poetry. The moral philosophy of India is contained in a work called *Code of Manu.* This is held to be as sacred as the Vedas, though composed several centuries later. It is worthy of note that the Sanskrit literature has now become the foundation of all philological studies. See VEDAS; LANGUAGE, subhead *Sanskrit Language.*

PERSIA. The literature of ancient Persia is mainly religious and includes the sacred books collected under the name Zend-Avesta. There are two other sacred books, one containing prayers and hymns, and the other, prayers to the genii that preside over the days of the month. There are also ancient Persian inscriptions consisting of about 1000 lines of cuneiform texts carved upon stone tablets and other hard substances. Of special interest is the document of Darius. On a portion of the rocky side of Mt. Behistun, he had engraved an account of his warlike deeds and the greatness of his empire. See ZEND-AVESTA; ZOROASTER.

GREEK LITERATURE

Of the literature of ancient times, the Greek has influenced most profoundly that of our later civilization. In fact, the Greeks laid the foundation of modern thought in many departments; they perfected the most important types of poetry; and they brought to artistic form such divisions of prose as history, oratory and philosophy. Greek literature has three well-defined periods, the first beginning in remote antiquity.

I. EARLY LITERATURE (before 1000 B. C. to 475 B. C.). The earliest Greek poems extant are the great epics of Homer, the *Iliad* and *Odyssey.* Although they were written about 1000 B. C., the language in which they are expressed is so highly developed that it is certain they are the outgrowth of an earlier literature, which took the form of songs and religious and heroic poems. A second poet of the Homeric period was Hesiod, a native of Bœotia. He was the author of the first didactic poem extant, and his poetry, in general, was designed to be instructive. After the epic had been introduced, elegiac, iambic and lyric poetry were created. The father of lyric poetry was Archilochus, who lived in 670 B. C. The lyric was further developed by Sappho, Anacreon and Simonides of Ceos, and finally culminated in the work of Pindar, the national lyrist of Greece. Philosophy began in this period, the Greeks being the first people to distinguish it from religion and mythology. See ILIAD; HOMER; HESIOD; SAPPHO; ANACREON; PINDAR.

II. Period of Attic Literature (475 B. C.-323 B. C.). After the Persian Wars Athens became preeminent in Greece, both politically and intellectually, putting the stamp of her marvelous civilization on all the literature produced in this period. The literary achievements of this era of Athenian supremacy have never been surpassed. This age saw the perfection of dramatic poetry through the work of the three great tragic poets, Æschylus, Sophocles and Euripides. Aristophanes was the great master of comedy.

Literary prose was perfected in this period, in the fields of history, oratory and philosophy. The three great historians of Greece were Herodotus, Thucydides and Xenophon. Herodotus was the first writer of artistic prose and is justly regarded as the father of history. Thucydides introduced the philosophical element into his writings. Xenophon was the author of the *Anabasis,* a work familiar to every student of ancient Greek. The Attic orators produced the most finished specimens of prose. The most illustrious of these was Demosthenes, also the greatest orator who ever lived. The Greek philosophers, the most famous of whom were Socrates, Plato and Aristotle, have exercised a potent influence on Western thought. See Æschylus; Euripides; Aristophanes; Sophocles; Herodotus; Thucydides; Xenophon; Demosthenes; Socrates; Plato; Aristotle; Drama.

III. Literature of the Decadence (323 B. C.-1453 A. D.). The downfall of Grecian independence was followed by a decline in literature. After the conquest of Greece by Philip of Macedon and Alexander the Great, the Egyptian city of Alexandria superseded Athens as an intellectual center. Certain prominent tendencies in literature, science and philosophy which had their origin in Alexandria have been included under the term *Alexandrian School.* Strictly speaking, there were two Alexandrian Schools, the first being a school of poetry and science; the second, a school of philosophy. The former, with which this article is concerned, embraces the literary and scientific activity of the rule of the Ptolemies, from 323 B. C. to 30 B. C., when the Ptolemy dynasty was overthrown by the Romans. Ptolemy Soter (reigning 323-285 B. C.), began to gather about him a circle of learned men, besides laying the foundations of the great Alexandrian Library. (See Alexandrian Library), and his successors also encouraged literature. The poetic forms chiefly cultivated by the Alexandrians were the epic, lyric and elegy, and the most distinguished poet was Callimachus. Many historians flourished, of whom the best known are Timæus and Polybius. Among the critics, Aristophanes of Byzantium, Aristarchus and Eratosthenes are especially noteworthy. The sciences of mathematics, astronomy and medicine were also successfully cultivated by such famous men as Euclid, Archimedes and Hipparchus. After the conquest of Greece by the Romans, Alexandria was gradually superseded by Rome as a literary center. Here flourished the historians Josephus and Plutarch, and the scientists Ptolemy and Galen.

Greek literature declined rapidly after Constantinople became the seat of government of the empire. It derived the most of its importance from the vast amount of history that was produced. The Eastern Roman Empire rendered its greatest service to literature in preserving for centuries the ancient classical learning. When Constantinople fell in 1453, Greek scholars who fled from the city brought to western Europe valuable manuscripts of the Greek classics, thus aiding in the great revival of learning of the 15th century. See Euclid; Archimedes; Hipparchus; Josephus, Flavius; Plutarch; Ptolemy; Galen, Claudius; Renaissance.

Roman Literature

In its influence on the world, the literature of Rome ranks next to that of Greece among the ancient literatures. The Romans were inspired in their writings by the Greeks, but they set the stamp

of their own peculiar genius on what they produced, and their literature, though lacking the grace and beauty of the Greek, was characterized by correctness and accuracy. In general, the Greeks considered beauty the ideal in all art; the Romans, utility. Strictly speaking, Rome had no literature until 241 B. C., the end of the First Punic War, but we know that there was a period of crude beginnings. Certain allusions point to the custom of chanting heroic lays and indicate that village festivals were celebrated with songs and dances. Legal codifications, official records and oratorical discourses existed. Thus there were the germs of a literature before 241 B. C.

I. Early Literature (241 B. C.-83 B. C.). The first literature of this period consisted chiefly of translations of Greek models into Latin. The innovator of this kind of writing was a Greek slave named Livius Andronicus. Nævius has the honor of being the first Roman poet. His chief works were comedies and an epic poem on the Punic War. Ennius, who wrote a history of the Romans in hexameter verse, was the most influential writer of this period. Plautus and Terence were the greatest writers of comedy. The prose of the period consisted of oratory, history, jurisprudence and grammar. Also in this period Lucilius gave permanent form to satiric poetry. See Ennius, Quintus; Plautus; Terence.

II. Age of Cicero (83 B. C.-43 B. C.). Latin prose attained a high degree of excellence in this period. The chief literary figure was Cicero, whose writings are models in style and composition. Other prose writers were Varro, who wrote on law, history, philosophy, grammar and agriculture; Sallust, the first true historian; and Cæsar, whose *Commentaries* are read in every high school. See Cicero, Marcus Tullius; Cæsar, Caius Julius.

III. Augustan Age (43 B. C.-14 A. D.). The period beginning in 43 B. C. was especially remarkable for its poetry. Vergil, who wrote the great Roman epic, the *Æneid,* and Horace, author of epistles, satires and odes, were the two greatest poets. Lucretius, Ovid and Catullus also contributed to the glory of this age. The greatest prose writer of the period was the historian Livy. See Vergil; Æneid; Horace; Livy; Catullus, Caius Valerius.

IV. Silver Age (14-117 A. D.). After the death of Augustus came the decline of Roman literature. Although conditions under some of the emperors were discouraging to the production of an independent and original literature, a few names in this period stand out brilliantly. Juvenal was the most illustrious of the satiric poets, and Lucan was the leading epic poet. Tacitus ranks among the great Roman historians, Quintilian, among the rhetoricians. Pliny the Younger is remembered for his charming letters. Seneca was the most eminent of the philosophers, and Pliny the Elder, author of a voluminous work on natural history, met a martyr's death in the eruption of Vesuvius. See Tacitus, Publius Cornelius; Quintilian.

V. Middle and Later Empire (117-526). Authors were numerous in the closing period, but few are interesting from a purely literary point of view. The most valuable works were the legal writings and those of the Church Fathers. During the fourth and fifth centuries A. D. the Roman tongue rapidly degenerated and finally ceased to be a living language. The great contribution of the Romans to civilization is in the field of legal and political science. Their writings in this department are absolutely unique, showing no trace of Greek influence. See Justinian; Augustine, Saint.

Arabian Literature

Arabian literature is of especial importance to us because it forms the connecting link between that of ancient and modern times, and its brilliant and rapid development is one of the main events of the Dark Ages. Before the time of Mohammed there had been inscribed on Egyptian paper a number of songs composed by their ancient poets, but Arabian

literature proper begins with the Koran, the Mohammedan bible, whose scattered leaves were collected in 633 by the successor of Mohammed. The fourth caliph from Mohammed began the extension of royal favor to letters, and in the early part of the ninth century Bagdad became a great literary center. From this time on until the 14th century the Arabians were active in spreading their learning throughout the whole Islam Empire.

In the realm of pure literature, we are especially interested in their poetry and tales. They were of an intensely poetical nature and their poetry is distinctly Oriental, being characterized by boldness of figure, richness of fancy and extravagance of expression. The fascinating collection of stories known as *The Arabian Nights' Entertainment* is familiar to every one. These tales, so richly imaginative and so brilliant in conception, have influenced in no small degree the literature of the southern part of Europe, and they are today read with delight by every nation into whose language they have been translated. See MOHAMMED; KORAN; ARABIAN NIGHTS' ENTERTAINMENT, THE.

ITALIAN LITERATURE

The Italian language was first used for literary purposes in the 13th century. Previous to this time Latin was used in prose, and French and Provençal in poetry. The real founder of Italian literature was Dante, whose *Divine Comedy* is one of the world's greatest poems. Two other writers added to the glory of this early literature: Petrarch, most illustrious of Italian lyrists, and Boccaccio, first writer of Italian classic prose. Petrarch and Boccaccio were enthusiastic students of the ancient classics and helped to bring about the revival of classical learning in Italy. The literary men of the latter part of the 14th century, and of the 15th, were so devoted to this study of the ancients that little native literature was produced for a century.

A new era began in the closing years of the 15th century during the reign of the Florentine despot, Lorenzo the Magnificent, himself a poet and patron of learning. The 16th century was a brilliant one. Among the eminent poets of this time were Ariosto and Tasso, authors of romantic and heroic epics. The most distinguished prose writer was Machiavelli, novelist and historian.

The 17th century, a period of lethargy and decline, was followed by a general intellectual awakening, and the 18th century saw the development of the Italian opera and of the comedy and tragedy. In the 19th century Italy became a united and independent nation, and the struggle for liberty was reflected in much of the literature. Fogazzaro and D'Annunzio take high rank among modern Italian writers.

English literature is greatly indebted to that of Italy, for the sonnet of Petrarch has been the model for English lyrists, and Chaucer, Spenser and Shakespeare were directly influenced by Italian writers. See DANTE, ALIGHIERI; PETRARCH, FRANCESCO; TASSO, TORQUATO; MACHIAVELLI, NICCOLÒ; BOCCACCIO, GIOVANNI; ARIOSTO, LUDOVICO; ANNUNZIO, GABRIELE D'; ALFIERI, VITTORIO.

FRENCH LITERATURE

The poems of the troubadours and trouvères are the chief literary productions of the early literature of France. The troubadours, who flourished in southern France, had a brilliant but temporary popularity from about 1100 to about 1400. Their language, the Provençal, eventually sank to a mere dialect. The trouvères, who were the poets of Normandy, were important during the 12th century. Their romances, tales and dramatic productions influenced materially the literature of England and of the other southern European nations. The first important prose writer appeared in the 14th century. This was Froissart, author of a history of the different states of Europe from 1322 to 1400. Sir Walter Scott called Froissart his master.

The Golden Age of French literature is the period between 1500 and 1700,

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which includes two great movements, the Renaissance and the Reformation. The chief writers of the 16th century are Rabelais, who typified the Renaissance, Calvin, who typified the Reformation, and Montaigne, a brilliant essayist and the first French philosophical writer in prose. The reign of Louis XIV has been called the Augustan Age of French literature. The drama was brilliantly developed through Molière, master of French comedy, and Corneille and Racine, great tragic dramatists. This age also produced La Fontaine, the most distinguished of French fabulists, and Fénelon, the author of a popular narrative.

In the 18th century lived the eminent dramatists Voltaire and Beaumarchais and the great novelist Le Sage. Other distinguished writers were Rousseau and Montesquieu. In this century skeptical philosophy reached its culmination, having its logical outcome in the French Revolution. In the second quarter of the 19th century there originated a movement for greater freedom in literary form. This Romantic movement, begun by Chateaubriand, was triumphantly consummated in the work of the great novelist Victor Hugo, but Romanticism as a movement was of short duration. The novelists, Dumas, Balzac, George Sand, Zola, Daudet and Maupassant; the critics, Sainte-Beuve and Gautier; and Alfred de Musset, poet, dramatist and novelist, are other eminent writers of the 19th century. French literature of today is remarkable for the excellency of its fiction and drama. The leading dramatist, Rostand, is a foremost European writer.

In general merit and quantity French literature excels that of any other European nation. The French have produced no great epic and few great tragedies, and none of their writers ranks with Shakespeare. On the other hand, their short stories, both in prose and verse, are unequaled, and their songs are the most graceful and their comedies the most laughable that the world has ever seen. French literature is, moreover, so clearly expressed, so charming in style and so frankly typical of the French people, that it will always be read with delight. See TROUBADOUR; TROUVÈRE; RABELAIS, FRANÇOIS; CALVIN, JOHN; MOLIÈRE, JEAN BAPTISTE; CORNEILLE, PIERRE; RACINE, JEAN; LA FONTAINE, JEAN DE; VOLTAIRE; HUGO, VICTOR MARIE; DUMAS, ALEXANDRE; SAND, GEORGE; SAINTE-BEUVE, CHARLES AUGUSTIN; ZOLA, ÉMILE; LE SAGE, ALAIN RENÉ; BALZAC, HONORÉ DE; ROSTAND, EDMOND.

Spanish Literature

Like other peoples, the Spanish first expressed themselves in poetry, and their earliest written production, *The Poem of the Cid,* is the oldest epic in any of the Romance languages. This poem, composed about 1200, celebrates the deeds of a great Spanish hero. The literature of Spain from the 14th century to the 16th consisted mainly of ballads, chronicles, romances of chivalry and religious dramas, all of which were dominated by the two prevailing traits of Spanish character, religious sentiment and loyalty. In the 12th century Provençal literature was introduced into Spain, but it did not long endure. In the early part of the 17th century Cervantes published his *Don Quixote,* a story that has had continuous popularity to this day. Contemporary with Cervantes was Lope de Vega (Vega Carpio), creator of the modern drama. The development of the Spanish drama in the 17th century forms a brilliant epoch in the literature of Spain. When the Bourbons succeeded to the throne of Spain, French influence became dominant, and Spanish literature was greatly influenced by the French in the 18th and 19th centuries. In the latter part of the 19th century the novel received special attention. See CERVANTES SAAVEDRA, MIGUEL DE; DON QUIXOTE; VEGA CARPIO, FELIX LOPE DE.

Portuguese Literature

The earliest literary productions of Portugal are fragments of ballads, Provençal in character, which were sung

by wandering minstrels. The first poets of importance flourished in the 15th century, when modern Portuguese began to take form. In the early part of the 16th century the foundations of a national literature were laid by Sá de Miranda, the most influential poet of his time. The greatest genius Portugal has ever produced is Camoens (1524-1580). His great masterpiece, an epic called the *Lusiad,* is about the only Portuguese poem known outside the peninsula. In modern Portuguese literature we find the novel and poetry reaching a high degree of excellence. See Camoens, Luis Vaz de.

Russian Literature

The beginnings of Russian literature are found in translations, from Old Church Slavic, of the Bible and books for use in the Church service. During the period of the Tartar invasion (1224-1237) literary progress received a check, and there was no serious revival until the 16th century. In the next century the first Russian newspaper was established. The greatest name in the literature of the 18th century is Lomonosoff (1711-1765). His works on rhetoric, grammar and versification laid the foundation of modern Russian literature. About the same time Sumarokoff established the pseudo-classical tragedy. The Romantic movement of the 19th century spread to Russia, and poetry received a great impetus. Pushkin, the greatest poet of Russia, successfully drew his materials from Russian antiquity and popular legends. Gogol (1809-1852) was the first great novelist. Turgeniev, Gorky, Dostoyevski and Tolstoy are the greatest names in modern Russian literature. See Gorky, Maxim; Turgeniev, Ivan; Tolstoy, Leo.

Dutch Literature

Of the various languages spoken in Holland and Belgium, the Dutch is the most important, and from an early date it has been the literary language of the inhabitants of Holland. The first literary works were translations of songs of minstrels and romances of chivalry.

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In the middle of the 13th century a Dutch translation of *Reynard the Fox* was made. About the same time, the first noted author, Jacob Maerlant, translated the Bible into Flemish rhyme. Erasmus, Grotius and Arminius were famous Latin writers of the Reformation period. The first writer of the 16th century who used the native tongue was Anna Byns, the "Flemish Sappho."

The marvelous development of the country in the 17th century had a parallel in literary progress, the chief writers being Hooft, poet and historian, Vondel, lyric, epic and tragic poet, and Jacob Cats, author of didactic and descriptive poems. The 18th century was, in general, a period of decline, though some very good poetry was written. The overthrow of the Dutch Republic was accompanied by a revolution in literature, and a number of poets and historians arose who reflected in their works the spirit of the new age.

The noteworthy writers of the early part of the 19th century were Bilderdijk, one of Holland's great poets, and Van der Palm, an eminent prose writer. Most of the literature produced by the Hollanders in the closing years of the 19th century was influenced by the scientific spirit. Dutch literature as a whole is marked by earnestness, simplicity and religious feeling. See Erasmus, Desiderius; Grotius.

German Literature

The first literary production of the Germans that we know about is a translation of the Bible into Gothic, by Ulfilas, Bishop of the Goths (d. about 381). During the next 400 years their literature consisted of the songs of minstrels, which were collected by Charlemagne, though only two relics of this ancient poetry have come down to us. When Charlemagne became emperor, he endeavored to improve in every way possible the intellectual condition of his people. Through his efforts literature received a stimulus, and in the ninth and tenth centuries poetry, the drama, prose and translations received attention.

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The period from 1140 to 1300 is the first Golden Age of German literature. The language used was Middle High German. This was the time of the Crusades and of chivalry, of splendid tournaments and gay festivals, of magnificent cathedrals and growing cities. The court of the Hohenstaufen dynasty favored the literature of chivalry, which flowered brilliantly for a century and a half. The minstrels of this age were called minnesingers, from an old German word meaning love. The greatest production of this time was the *Nibelungenlied,* a folk epic containing the hero songs of the leading German tribes, which had been sung for centuries by wandering minstrels. A second national epic, the *Gudrun,* also belongs to this period. Numerous romances of chivalry were translated at this time; of special interest are those relating to Arthur and his knights of the Round Table, probably obtained from Britain. Stories about Charlemagne were translated from the French, and a third group relates to the ancient classical heroes. Early in the 12th century we also find the beginnings of the drama in the miracle and mystery plays. The literature of the 14th and 15th centuries is inferior, consisting mainly of the poetry of the mastersingers and the prose writings of the monks.

In the 16th century came Luther and the Reformation. This century saw the beginning of modern German literature. Luther's translation of the Bible and his stirring hymns gave the German people a literary language, and they justly regard him as the creator of German prose. Second in influence to Luther was Melanchthon. The leading poet of this period was the mastersinger Hans Sachs. After the death of Luther the confused condition of affairs in Germany, culminating in the Thirty Years' War, had a disastrous effect on the literature, and it was not until the 18th century that it again reached a high degree of excellence.

In the 18th century the four great writers were Klopstock, creator of the modern German lyric; Wieland, author of the famous romantic poem *Oberon* and the first writer to familiarize the Germans with Shakespeare; Lessing, author of the first masterpiece of German comedy; and Herder, influential as a poet, theologian, philosopher and critic. These writers paved the way for the second Golden Age of literature of the 19th century. This illustrious century produced the great poetic dramatists, Goethe and Schiller, and a host of other writers in various fields; poetry, the drama, philosophy, history, science, literary criticism, the novel and the fairy tale, were all developed through the excellent work of men and women who helped to place German literature among those of first rank. At the opening of the 20th century, Hermann Sudermann and Gerhart Hauptmann were notable literary figures. See NIBELUNGENLIED; MINNESINGER; MASTERSINGER; LUTHER, MARTIN; SCHILLER, JOHANN; LESSING, GOTTHOLD EPHRAIM; GOETHE, JOHANN; KLOPSTOCK, FRIEDRICH GOTTLIEB; WIELAND, CHRISTOPH MARTIN; HERDER, JOHANN; HEINE, HEINRICH; UHLAND, JOHANN LUDWIG; GRIMM, JACOB AND WILHELM.

Scandinavian Literature

The Scandinavian languages include the Icelandic, Norwegian, Danish and Swedish. Originally, a fairly uniform language, known as primitive Scandinavian, was used by the inhabitants of Scandinavia, but between 700 and 1000 this language began to show forms of differentiation, and by 1000, four separate dialects could be distinguished. The Icelandic and Norwegian are often comprehended in the term *Western Scandinavian;* the Danish and Swedish in the term *Eastern Scandinavian.*

ICELAND. About 900 Iceland was colonized by certain inhabitants of Norway who were unwilling to remain the dependents of a conqueror who had introduced the feudal system. After this time there was developed in Iceland a distinct West Norwegian dialect, which by the year 1000 could be designated Icelandic. The literary history of the island can

be divided into two main periods, Old Icelandic and New Icelandic, the former dating from 900 to the time of the Reformation. The earliest and most important monument of Icelandic literature is the so-called *Poetic Edaa,* a collection of poems of varying length, and probably dating from the tenth century (See EDDA). The earliest Icelandic prose appeared in the 12th century, when Ari the Wise composed a history of the island. About a century later Snorri Sturluson produced a history of the early kings of Norway, entitled the *Heimskringla,* which is still read in Iceland. In 1222 he completed the *Prose Edda,* containing stories of the gods and goddesses. Also in this early period there were composed in prose, numerous tales known as Sagas, valuable not only as literary productions, but also for the light they throw upon Old Norse customs (See SAGA). The poetry of the scalds (See SCALD) is another form of early Icelandic literature.

Modern Icelandic literature began in 1530, when printing was introduced into the island. During the 17th century many scholarly works were written and grammars and dictionaries compiled. At this time, and down to the present, numerous poets flourished.

DENMARK. Danish literature previous to the Reformation is unimportant; for several centuries Latin was used as the literary language. Christian Pedersen, who was the first to set up a printing press, printed a complete translation of the Bible in Danish in 1550, and is regarded as the father of Danish literature. The first writer of world-wide fame was Tycho Brahe (1546-1601). Holberg (1684-1754) was the founder of Danish comedy and the creator of the modern literature of Denmark, for he wrote for the people and made their tongue a popular literary medium. Evald (1743-1781), a disciple of the German Klopstock, was the first lyric poet and tragic dramatist. He was also the author of the national song of Denmark, *King Christian.*

The literature of Denmark came under the influence of German thought in the early part of the 19th century, resulting in a new school of poets. The most important of these poets was Oehlenschläger, who combined the legends of the Eddas into one great poem. The last century has produced many distinguished names in prose and poetry, but the one best known to English readers is that of Hans Christian Andersen. The 19th century also produced the great critic, Georg Brandes. See BRAHE, TYCHO; ANDERSEN, HANS CHRISTIAN; BRANDES, GEORG MORRIS COHEN.

SWEDEN. Ancient Swedish literature exists in the form of runes. These indicate that at an early date the country possessed many legends and hero tales. After the introduction of Christianity the literature was chiefly of a religious nature, though romances of chivalry were popular. After the Reformation poetry was especially developed, and in the 17th century literary taste showed great improvement. In the 18th century French influence was dominant in Sweden as in other European countries. The effect on Swedish literature was to make it formal and lacking in originality and imaginative quality. Of the prose writers of this period, Dalin is especially interesting for establishing a periodical modeled on Addison's *Spectator.* His services to Swedish literature were much the same as Addison's to English literature. King Gustavus III, who began to rule in 1771, was a patron of learning and a dramatist of merit. The best poets of the period were Kellgren, Leopold and Oxenstjerna.

With the decline of French influence there came a reaction and the rise of new schools of literature. The great Romantic movement of the 19th century deeply influenced Swedish literature, resulting in many productions that were national in character. Foremost among the writers of this century were Geijer, a poet and the first historian of Sweden, Tegnér, the greatest of her poets, and Runeberg, the national poet of Sweden and Finland. Among the many Swedish novelists of the 19th century, Fredrika Bremer gained special distinction. A noted Swedish writer of more recent

date is Selma Lagerlöf, who in 1909 was awarded the Nobel prize for literature. August Strindberg (d. 1912) was an eminent novelist and dramatist. See BREMER, FREDRIKA; LAGERLÖF, SELMA; RUNEBERG, JOHAN LUDVIG; TEGNÉR, ESAIAS; STRINDBERG, AUGUST; RUNES.

NORWAY. The early period of the Norwegian language is similar to that of the Icelandic. Between 1350 and 1530, Norwegian was influenced by the Swedish and Danish languages, and when, in 1397, the Union of Kalmar lost for Norway her independence, Danish was substituted for the native language in matters of literature and public business. The modern standard language differs slightly from the Danish spoken in Denmark, and is sometimes spoken of as Dano-Norwegian. National Norwegian literature is generally regarded as dating from 1814, when Norway was separated from Denmark. However, early Norwegian literature is preserved in the Eddas of Iceland, and there were numerous writings by Norwegian authors during the period when Norway and Denmark were politically one. The period of broadest development in Norwegian literature began with Ibsen and Björnson, Norway's most eminent writers. Lie and Kielland were other important writers of this epoch. See IBSEN, HENRIK; BJÖRNSON, BJÖRNSTJERNE.

ENGLISH LITERATURE

To study the progress of a literature written in the tongue that we speak, is manifestly a delightful task. Because of their importance and interest to our readers, English writings are given relatively greater space than those of other nations. Special articles are devoted to the literature of the United States and that of Canada.

I. ANGLO-SAXON PERIOD (600-1066). The story of English literature is as old as the story of the English people, and, like their history, it had its beginnings in Continental Europe, where their Anglo-Saxon forefathers of Denmark and northern Germany delighted to hear the wild battle lays and sea minstrelsy of their gleemen. The most important relic of this early poetry is the epic *Beowulf,* written in its present form on English soil, probably in the eighth century. After the Anglo-Saxons had conquered the island, Old English literature began to take form through the writings of Cædmon, the first poet of Christian England; Bede, the father of English poetry; and King Alfred, the father of English prose. See BEOWULF; CÆDMON; BEDE; ALFRED THE GREAT; ANGLO-SAXON CHRONICLE.

II. FROM THE CONQUEST TO THE DEATH OF CHAUCER (1066-1400). The period dating from the Norman Conquest of England to the death of Chaucer is sometimes known as the Anglo-Norman Period, for during the three and a half centuries following 1066, the English language, becoming the basis of our modern speech, was wonderfully enlarged and enriched by its contact with the language of the Norman-French, while the conquerors, representing the highest culture of Europe, brought new elements to English life and literature that were to prove of lasting benefit. The literature of the first century and a half following the Conquest, during which time the French language was dominant, consisted chiefly of metrical romances, rhyming chronicles and religious poems, written in French or Latin, and is of interest to us as the source of some later English productions. About 1205, however, the native literature awakened from its 150 years of slumber with the appearance of a poem called *Brut,* written by a priest, Layamon, who told in the English tongue the legends of King Arthur. Religious poems and romances in verse began to follow, together with some charming little lyrics which sang of the glories of the spring and of the birds and blossoms. About 1362 appeared an alliterative allegorical poem entitled *The Vision of William Concerning Piers the Plowman* (See LANGLAND, WILLIAM), and about the same time Wiclif began a translation of the Bible. See WICLIF, JOHN.

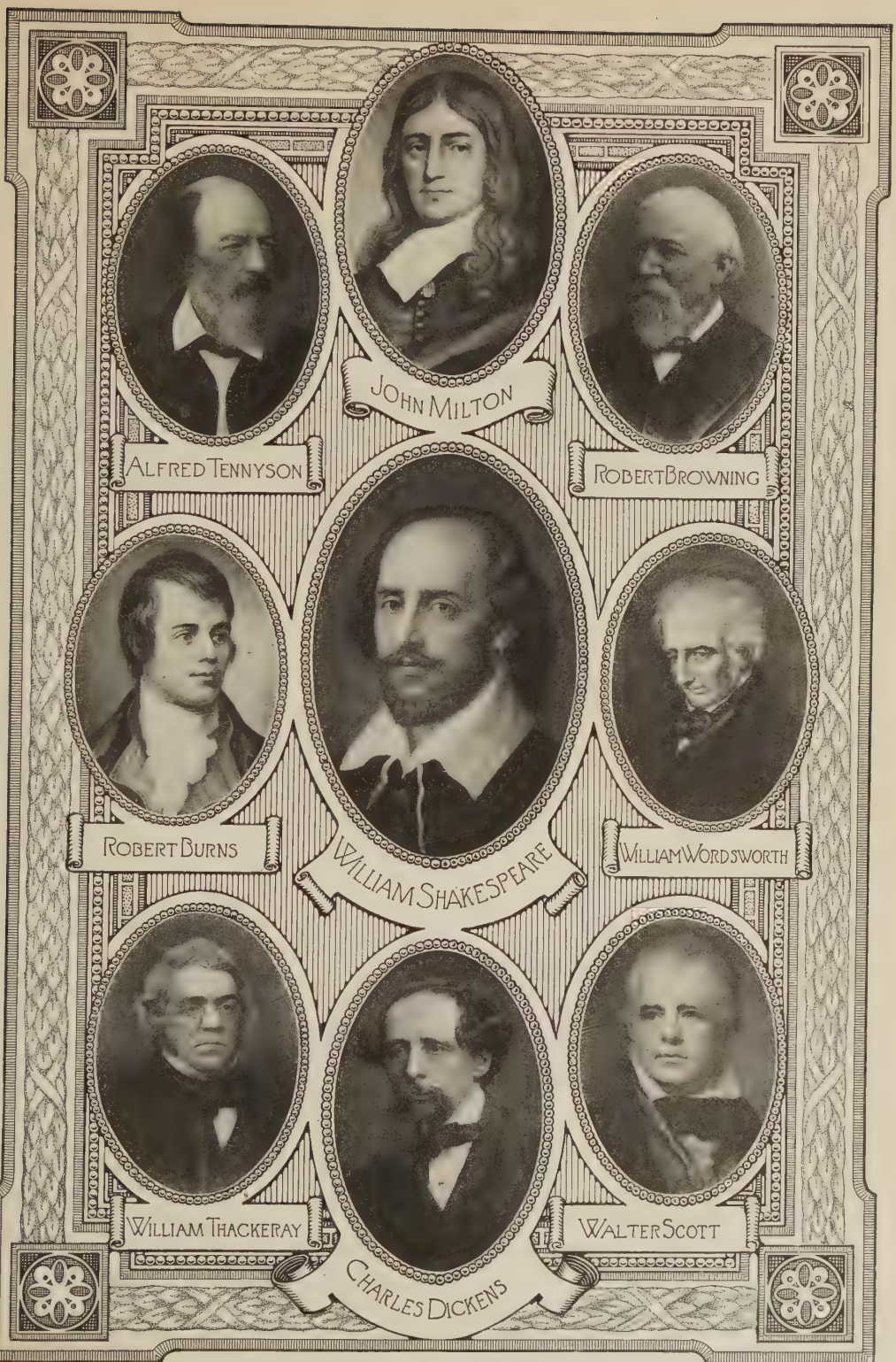
During the second half of the 14th century, Geoffrey Chaucer, the first great poet, produced that masterpiece of Middle English literature, the *Canterbury Tales*. Not only did he reveal the permanence and vitality of a newly developing literature, but he used the East-Midland dialect so effectively that it became the standard literary language from which Modern English is derived. Chaucer's death in 1400 marks the end of what we may term the preparatory period in English literature. See CHAUCER, GEOFFREY.

III. FROM THE DEATH OF CHAUCER TO ELIZABETH (1400-1558). The century following the death of Chaucer was an era of change, and the times were not suited to the production of a creative literature. The chief activity in the field of poetry was the making of ballads, and the important prose production of the century was Sir Thomas Malory's account of the legends of King Arthur (See MALORY, SIR THOMAS). The first part of the 16th century is memorable for the *Translation of the New Testament* by William Tyndale, for the production of the first English comedy, *Ralph Roister Doister,* and for the introduction of the sonnet and of blank verse (See WYATT, SIR THOMAS; SURREY, HENRY HOWARD, EARL OF; UDALL, NICHOLAS). The second half of the century saw the ushering in of the most brilliant period in the history of English literature, the Elizabethan Era.

IV. ELIZABETHAN PERIOD (1558-1625). The splendid achievements of the Elizabethan Age were the result of certain events of world-wide importance. These were the introduction of printing into England by Caxton in 1476, the revival of classical learning, the discovery of America, and the Protestant Reformation, events which tended to free men's minds, direct their interests into new channels and make life infinitely more rich and varied. The reign of Elizabeth brought peace and unity to the nation and gave opportunity for the working out of the new world-forces in a marvelous, creative literature. The spirit of the age was felt beyond the reign of Elizabeth, through the reign of James I. Poetry reached a degree of excellence never since surpassed, through the works of Shakespeare, Spenser, Marlowe, Jonson and their contemporaries; representative prose writers were Bacon, Hooker, Raleigh, Sidney and Lyly. The most important work was accomplished in the field of lyric and dramatic poetry, but to this age belongs that masterpiece of English prose, the King James Version of the Bible. See SHAKESPEARE, WILLIAM; CAXTON, WILLIAM; SPENSER, EDMUND; MARLOWE, CHRISTOPHER; JONSON, BEN; RALEIGH, SIR WALTER; BACON, SIR FRANCIS; SIDNEY, SIR PHILIP.

V. FROM THE ELIZABETHAN PERIOD TO THE RESTORATION (1625-1660). The period between 1625 and 1660 was one of religious controversy and social and political change, and the age as a whole was not favorable to literary effort. In this period the Puritans became dominant in government and social life, and their influence on literature is seen in the theological and argumentative trend of the prose of the times. The great writer of the period was Milton, whose early poems were written soon after the death of James I, and whose masterpiece, *Paradise Lost,* appeared after the Stuarts had been restored and the Commonwealth had passed into history. *Paradise Lost,* though essentially Puritan in theology, is marked by sublimity of thought and expression and is one of the world's great epics. See MILTON, JOHN.

VI. RESTORATION PERIOD (1660-1700). The Restoration of the Stuart line in 1660 was followed by a marked reaction against Puritanism, and much of the literature of the period was a reflection of the ungodly and frivolous court of Charles II. The drama was revived, but the plays written were so corrupt that they are not read today. The two greatest writers of the period were John Bunyan, whose story *The Pilgrim's Progress* is the best allegory in the English language; and John Dryden, critic, dramatist and poet. Modern



BRITISH AUTHORS

Home of Shakespeare

Anne Hathaway Cottage

ASSOCIATED WITH SHAKESPEARE

prose is indebted to Dryden for his adoption of the unified sentence, and in both prose and poetry he set an example of correctness. This was the period of the formation of new literary ideals, a notable example being the adoption of the rhyming couplet as the suitable poetic form. The writings of the period show the influence of French literature. See DRYDEN, JOHN; BUNYAN, JOHN.

VII. EIGHTEENTH CENTURY PERIOD (1700-1800). The tendency of the writers of the preceding period to adhere to definite literary rules had its culmination in the 18th century, which in its literary aspect was an age of regularity. Form counted for more than originality of thought. In the first half of the century Swift produced his classic in the field of satire, *Gulliver's Travels;* admirable essays were written by Addison, whose charming prose style is effectively expressed in that unique contribution to periodical literature, the *Spectator;* Defoe gave the world *Robinson Crusoe,* the forerunner of the modern novel. The leading poet of the times was Pope, a writer whose influence on his age was remarkable. Although his poems are models of perfect form, they lack the imaginative element and human interest that we look for in poetry of the highest type. Pope used the rhyming couplet with the highest degree of skill.

Samuel Johnson, poet, essayist and dictionary maker, is the central literary figure of the second half of the century, though his fame rests more on his personality and influence than on his writings. Goldsmith, contemporary of Johnson, is remembered for his excellent plays, his charming story, *The Vicar of Wakefield,* and his poems, which, though written in the form of those of Pope, are quite different in spirit and foreshadow the poetry of a new age. In this period the novel was brought to definite form through the writings of Richardson, Fielding, Smollett and Sterne. Two great writers of history were Hume and Gibbon, and oratory was perfected by Burke.

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This century is also remarkable for the beginnings of a revolt against the school of poetry of which Pope was the leader. A group of poets began to write in a manner which showed a definite departure from the old ideal, both in form and subject matter. These poets displayed an interest in the beauties of natural scenery and in the feelings of man in the humble walks of life. The greatest of them, the Scottish poet, Burns, wrote his exquisite lyrics in the closing years of the century, preparing the way for the new movement of which Wordsworth was the apostle. See SWIFT, JONATHAN; ADDISON, JOSEPH; STEELE, SIR RICHARD; DEFOE, DANIEL; POPE, ALEXANDER; JOHNSON, SAMUEL; GOLDSMITH, OLIVER; RICHARDSON, SAMUEL; FIELDING, HENRY; SMOLLETT, TOBIAS; STERNE, LAURENCE; BURNS, ROBERT.

VIII. PERIOD OF ROMANTICISM (1800-1837). The revolt against the old style of poetry was fully consummated in the poetry of the Romantic Period. The poems of this era express the beauties of external nature and the effect of nature on man. They glow with feeling, show a wide range in style and assert the right of man to express his spiritual instincts with sincerity and freedom. The greatest of these poets, Wordsworth, Coleridge, Byron, Shelley and Keats, were all passionately devoted to the ideal of freedom in thought and form, yet each was individual in the poetic expression of his ideals.

Not only in poetry, but also in prose was the Romantic movement expressed. We find in the literary criticism of the period a broader view and a more sympathetic appreciation of literature. The leading exponents of the Romantic School of criticism were Hazlitt, Lamb and De Quincey. Lamb, however, is best remembered for his delightful *Essays of Elia.* In the realm of fiction, the most notable productions were the romances of Scott and the stories of English life written by Jane Austen. See WORDSWORTH, WILLIAM; COLERIDGE, SAMUEL TAYLOR; BYRON, GEORGE NOEL; SHELLEY, PERCY BYSSHE; KEATS,

LITERATURE

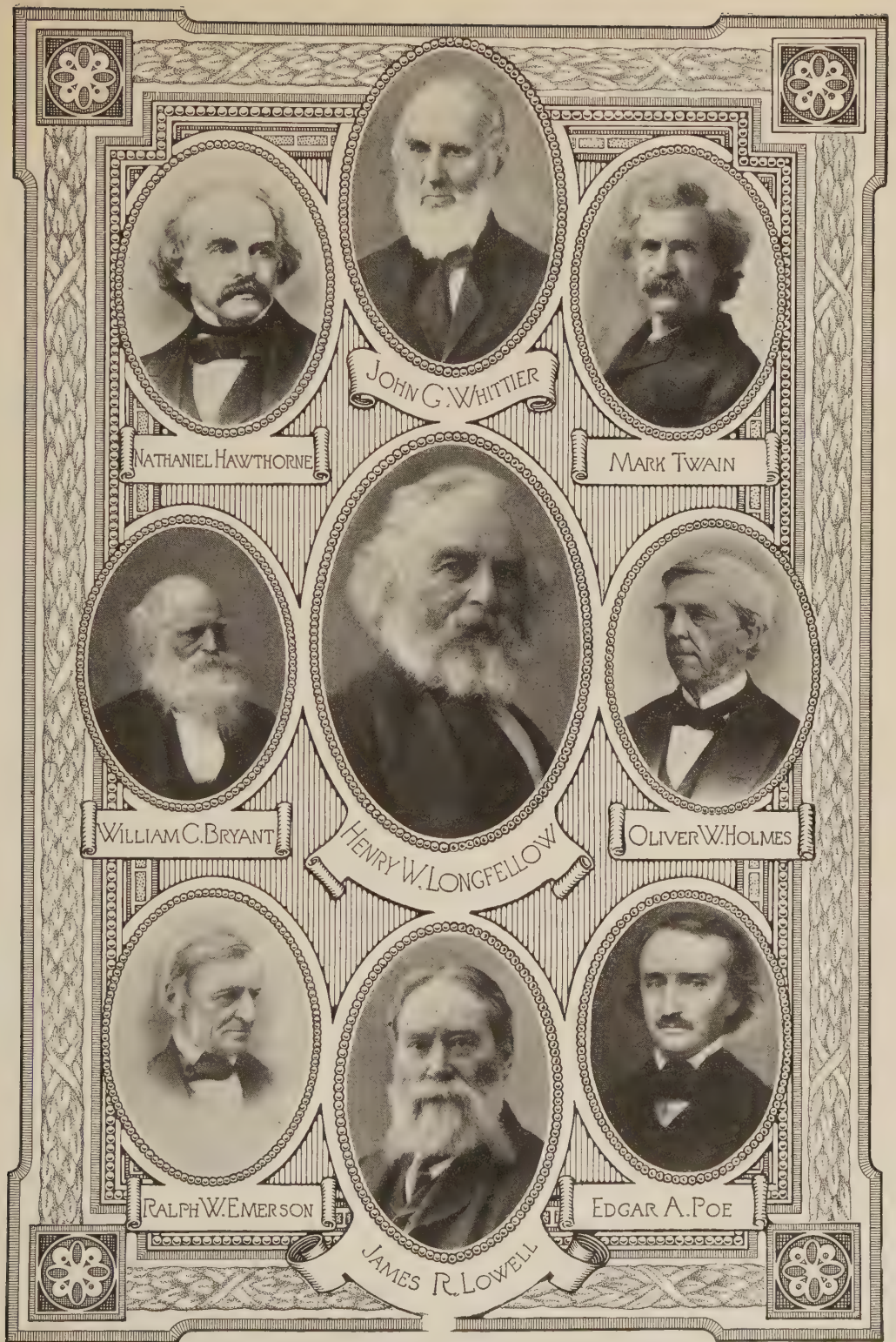
JOHN; LAMB, CHARLES; DE QUINCEY, THOMAS; SCOTT, SIR WALTER; AUSTEN, JANE.

IX. VICTORIAN PERIOD (1837-1901). With the passing away of the writers of the Romantic Period, there came a few years' lull in literary effort, but during this interval new forces were developing which had a tremendous effect on the literature that was produced during the reign of Victoria. With the growth of democracy, the advancement of science and the development of commerce and industry came the awakening in the masses of a demand for social justice, and this demand was voiced by many of the writers. Thus the literature may be said to have an ethical purpose. The brilliant achievements of Thackeray, Dickens, George Eliot, Meredith and many other novelists, in the realm of fiction, and the work of the essayists and literary critics, Macaulay, Arnold, Carlyle and Ruskin, have made the prose of the Victorian Age outrank that of any other period in extent, variety and finish in style. In poetry, Tennyson and Browning were the two great masters. Of the lesser poets, Mrs. Browning, Rossetti and Swinburne produced work of enduring value. Notable work was also accomplished in this period in history, philosophy and science. See THACKERAY, WILLIAM; DICKENS, CHARLES; ELIOT, GEORGE; MACAULAY, THOMAS; ARNOLD, MATTHEW; CARLYLE, THOMAS; RUSKIN, JOHN; TENNYSON, ALFRED; BROWNING, ROBERT; BROWNING, ELIZABETH BARRETT; SWINBURNE, ALGERNON.

X. LITERATURE OF TODAY. English literature of the 20th century has great variety and interest. Thomas Hardy, whose greatest novels were produced in the Victorian Period, remained a notable literary figure at the opening of the new century. The group of modern writers of fiction includes Rudyard Kipling, Maurice Hewlett, Leonard Merrick, Gilbert K. Chesterton, Hall Caine, A. Conan Doyle, Herbert G. Wells, Mrs. Humphry Ward, Edward V. Lucas, E. Temple Thurston, William De Morgan, Anthony Hope Hawkins and Arnold Bennett. A number of British dramatists are contributing to a genuine revival of the acted drama, and many of the plays now seen in the theaters reveal that these playwrights are animated by a desire to represent British life as it is actually lived. Henry A. Jones, James Barrie, Bernard Shaw, John Galsworthy and Sir Arthur Pinero form a notable group of successful dramatists. Among the poets, Alfred Noyes and John Masefield are attracting much attention. There is also activity in the fields of criticism, history and biography. The literary phase of the Irish national movement will be found treated in the topic IRISH PLAYS and in the biographies of Lady Gregory, William B. Yeats and John M. Synge. See KIPLING, JOSEPH RUDYARD; HEWLETT, MAURICE HENRY; CHESTERTON, GILBERT KEITH; CAINE, THOMAS HENRY HALL; DOYLE, SIR ARTHUR CONAN; WARD, MARY AUGUSTA; DE MORGAN, WILLIAM FREND; HAWKINS, ANTHONY HOPE; BENNETT, ENOCH ARNOLD; JONES, HENRY ARTHUR; BARRIE, JAMES MATTHEW; SHAW, GEORGE BERNARD; GALSWORTHY, JOHN; PINERO, SIR ARTHUR WING; MASEFIELD, JOHN; NOYES, ALFRED; MOORE, GEORGE; MERRICK, LEONARD; LUCAS, EDWARD VERRALL; PHILLIPS, STEPHEN.

AMERICAN LITERATURE

I. COLONIAL AND REVOLUTIONARY PERIOD (1607-1800). The character of the writings of the American people during the first two centuries of their history was determined largely by material conditions. The early colonists had to deal with the problems of conquering the wilderness, subduing the Indians and building homes, and in such conditions there is little leisure for the production of a creative literature. Later the struggle with the Mother Country and the effort to found a new government occupied their attention. Their interests, too, lay in religious rather than purely literary works. Consequently, during the 17th century the greater proportion of the writings were theological and his-



AMERICAN AUTHORS

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torical in character. The first book printed in the colonies, the *Bay Psalm Book,* appeared in 1640. Of the poetic writings of this time those of Anne Bradstreet best deserve a place in literary history.

The theological writings of Cotton Mather and Jonathan Edwards occupy a prominent place in the literature of the 18th century. The greatest name of this century is that of Benjamin Franklin (1706-1790), whose *Autobiography* is a truly literary classic. Toward the end of the century a group of poets arose, known as the "Hartford Wits." The most important of these were John Trumbull and Joel Barlow. Contemporary with these was the poet Philip Freneau, whose works show real literary excellence. Mention should also be made of the writings of the public men and orators of Revolutionary fame, contained in the collection of political essays known as *The Federalist.* In the closing years of the century the first American novelist appeared, Charles Brockden Brown. See FEDERALIST, THE; FRANKLIN, BENJAMIN; BROWN, CHARLES BROCKDEN.

NATIONAL PERIOD (1800-). Washington Irving was the first American man of letters to win recognition in Europe. Irving's charming essays and miscellaneous prose, Cooper's novels and Bryant's poetry were the best literature of the early part of the 19th century. A little later appeared Poe (1809-1849), the most original genius America has ever produced. Taking a general view of the period beginning in 1800, we find American literature developing along definite lines and various departments represented by able writers. The earlier group of historians, consisting of Bancroft, Prescott, Parkman and Motley, has given us scholarly and fascinating narratives covering a wide field. Of a later date are John Fiske, John B. McMaster, Woodrow Wilson and James Ford Rhodes. Of our statesmen, Webster, Lincoln and Hay have permanent places in literary history.

The best American poetry after Poe was produced by the famous New England group consisting of Longfellow, Whittier, Emerson, Holmes and Lowell. The last three were also eminent prose writers, and Emerson was the most distinguished of a group of writers who came under the influence of German philosophy and who belonged to what was known as the Transcendental School. Walt Whitman and Sidney Lanier are two other earlier poets whose work has endured. Many later poets are typically American in theme and style; of these we may mention Eugene Field, James W. Riley, Will Carleton, Bret Harte and Joaquin Miller. Mention should also be made of C. E. Stedman, William Vaughn Moody, Ella Wheeler Wilcox and Richard W. Gilder.

The greatest American novelist, Hawthorne (1804-1864), has had no equal, but fiction of decided merit has been produced since his time, both in the form of the novel and of the short story. In the middle of the 19th century came Mrs. Stowe's epoch-making work, *Uncle Tom's Cabin.* Story-writers since the Civil War have been numerous. At the head of American novelists of the later school is William Dean Howells, who has produced a series of stories depicting, in a strikingly realistic manner, contemporary American life. Henry James, a writer who has made his home in England for many years, has given us the "international novel." F. Marion Crawford is another novelist who chose foreign themes; his stories deal with contemporary Italian life. In a class by himself is that unique humorist Mark Twain, while Frank Stockton will be remembered for the quaintness and originality of his stories.

An interesting development of American fiction since the Civil War is the prominence given to local scenes and characters. A few years ago Edward Eggleston was writing stories of Hoosier life, while Thomas Bailey Aldrich in his *Story of a Bad Boy* vividly portrayed boy life in a New Hampshire town. Virginia has been represented by Thomas Nelson Page; the Tennessee Mountains

by Charles E. Craddock; Kentucky by James Lane Allen; Louisiana by George W. Cable; Georgia by Joel C. Harris; the West by Bret Harte and Owen Wister; New England by Mary Wilkins Freeman and Kate Wiggin Riggs. From Frank Norris, Winston Churchill and William Allen White we have had studies of certain phases of American business and politics. Jack London and Hamlin Garland have produced stories of the adventure type. Among women novelists, Margaretta Deland, Edith Wharton and Frances H. Burnett have a high place. Other story-writers who have found favor are Richard Harding Davis, Robert Grant, Irving Bacheller, F. Hopkinson Smith, S. Weir Mitchell, Harold B. Wright, Alice Hegan Rice, Josephine Daskam Bacon, Kathleen Norris, John Fox, Jr., Robert Herrick and Mary Johnston.

The second half of the 19th century saw the production of creditable work in literary criticism, biography and the essay; representative names in these fields are Thomas W. Higginson, Edmund C. Stedman, Donald G. Mitchell, Charles D. Warner, Richard W. Gilder, George E. Woodberry, Brander Matthews, Thomas R. Lounsbury, Henry Van Dyke, Hamilton W. Mabie, John Burroughs and Ida Tarbell. The greatest monument of American scholarship is the Variorum edition of Shakespeare, by Horace H. Furness. Most of these writers are treated in separate biographies.

Canadian Literature

The literary writings of the Canadians are marked by freedom and vigor, and show the influence of a new country which has magnificent possibilities. French-Canadian literature had its beginnings in the writings of the old French explorers and missionaries, who recorded in prose and poetry their impressions of New France. A list of the writers of this period would include such names as Cartier, Champlain, Father Hennepin and Pierre de Charlevoix. As the country was opened to settlement and trade, many works of a descriptive and historical character were produced, chief among which was Garneau's *History of Canada,* completed in 1852. Of the French-Canadian poets, Louis H. Fréchette (1839-1908) was generally regarded as the representative poet of French Canada.

The first English-Canadian writers were, like the French, explorers and historians. Notable among these early writers was Alexander Mackenzie, who wrote a narrative of his explorations. With the union of Upper and Lower Canada in 1841 came a new era in Canadian literature, and from this time the feeling of nationality is noticeable in verse and prose. This spirit has been still more marked since the establishment of the Confederation in 1867. The best English-Canadian poetry of the 19th century was produced by Archibald Lampman, Charles G. D. Roberts, William Wilfred Campbell, Bliss Carman and Sir Gilbert Parker. E. Pauline Johnson was honored as the poet of the Indians. Among others may be mentioned William D. Lighthall, Charles Mair, Duncan C. Scott and Robert Service. Fiction of high rank has been written by Charles W. Gordon (Ralph Connor) and Sir Gilbert Parker; Ernest Thompson Seton is preeminent as a writer on animal life; and J. Castell Hopkins is noted for his biographical writings. See Fréchette, Louis Honoré; Haliburton, Thomas Chandler; Lampman, Archibald; Roberts, Charles George Douglas; Campbell, William Wilfred; Carman, William Bliss; Parker, Sir Gilbert; Johnson, Emily Pauline; Lighthall, William Douw; Scott, Duncan Campbell; Hopkins, John Castell; Mair, Charles; Service, Robert W.; Gordon, Charles William; Seton, Ernest Thompson.

The chart on the following pages presents in chronological order the significant names in the literatures of America and England, as well as the most important of foreign nations. The chart is representative rather than exhaustive, especially those pages showing the writings of the 19th and 20th centuries.

ENGLISH LITERATURE	FOREIGN LITERATURE
Anglo-Saxon Period—600-1066 *Beowulf,* Anglo-Saxon epic originated before 449, put in its present form by a Northumbrian poet, in the eighth century. Cædmon, first Christian poet: *Paraphrase of the Scriptures,* about 670. Bede, first historian: *Ecclesiastical History of the English People,* 731; science and philosophy. Cynewulf: secular and religious poetry, about 750. Alfred the Great: translations; *Anglo-Saxon Chronicle* begun under his direction, about 892.	The Koran, 633.
From the Norman Conquest to the Death of Chaucer—1066-1400 1066-1200—Latin and Norman-French writings. Layamon: *Brut,* poetic version of the King Arthur legends, about 1205. Ormin: *Ormulum,* devotional work in verse, about 1215. Robert of Gloucester: *Chronicle of England,* in verse, about 1298. Richard Rolle: *Pricke of Conscience,* about 1330. William Langland: reputed author of *Piers the Plowman,* allegorical poem, 1362. John Wiclif: *Translation of the Bible,* 1380. John Gower: *The Lover's Confession,* about 1393. Geoffrey Chaucer: *Canterbury Tales* (about 1386-91); and other poems, 1368-99.	Poetry of the scalds, 800-1100. *Elder Edda,* 10th and 11th centuries. Firdousi: *Book of Kings,* 971-1006. Omar Khayyám: the *Rubáiyát,* about 1120. *Nibelungenlied,* about 1140. *The Poem of the Cid,* about 1200. Wolfram von Eschenbach: *Parzival,* about 1205. Snorri Sturluson: *Prose Edda,* about 1222. Dante: *Divine Comedy,* 1314-21. Planudes: collection of *Æsop's Fables,* about 1327. Boccaccio: *Decameron,* 1348-53. Petrarch: *Sonnets,* about 1348. Froissart: *Chronicles,* 1372.
From the Death of Chaucer to Elizabeth—1400-1558 1400-1500—Century of Scottish and Border ballads. Sir Thomas Malory: *Morte D'Arthur,* prose account of the Arthur legends, 1470. William Caxton, first English printer: *Translation of Reynard the Fox,* 1481. Sir Thomas More: *Utopia,* 1515-16. William Tyndale: *Translation of the New Testament,* 1525. Miles Coverdale: *Translation of the Bible,* 1535. Nicholas Udall: *Ralph Roister Doister,* first English comedy, about 1536. Roger Ascham: *Toxophilus,* 1545. Sir Thomas Wyatt and the Earl of Surrey: first English sonneteers; sonnets published in *Tottel's Miscellany,* 1557.	Printing invented, about 1448. Gutenberg: Mazarin Bible printed, 1450-55. Machiavelli: *The Prince,* 1513. Erasmus: *Translation of the Greek Testament,* 1516. Luther: *Translation of the New Testament,* 1522. Ariosto: *Orlando Furioso,* 1532. Rabelais: *Gargantua,* 1535. Calvin: *Institutes of the Christian Religion,* 1536.
Reigns of Elizabeth and James I—1558-1625 Thomas Sackville: *Mirrour for Magistrates,* in verse, 1559; *Gorboduc,* first English tragedy, in collaboration with Thomas Norton, 1561. Edmund Spenser: *The Shepheardes Calendar,* 1579; *The Faerie Queene,* 1590-96. John Lyly: *Euphues,* 1579; *Endymion,* 1591. Sir Philip Sidney: *Defence of Poesie,* 1581; *Arcadia,* 1590; *Astrophel and Stella,* 1591. Christopher Marlowe: *Tamburlaine,* 1587-90; *Doctor Faustus,* 1588; *Edward the Second,* 1592. William Shakespeare: *Love's Labour's Lost,* 1590; *Richard III,* 1593; *The Merchant of Venice,* 1594-95; *Hamlet,* 1602; *Macbeth,* 1605-06; *The Tempest,* 1611. Ben Jonson: *Every Man in His Humour,* 1596-98; *The Sad Shepherd,* 1637; lyrics. Sir Francis Bacon: *Essays,* 1597. Authorized Version of the Bible, 1611. Sir Walter Raleigh: *History of the World,* 1614; poetry, travels.	Hans Sachs: poems, tales, dramas, 1523-73. Camoens: the *Lusiad,* 1572. Tasso: *Jerusalem Delivered,* 1574. Montaigne: *Essays,* 1580, 1588. Lope de Vega: poems, novels, plays, 1602-34. Cervantes: *Don Quixote,* 1605, 1615.

ENGLISH LITERATURE

1625-1700

The cavalier poets: Thomas Carew, John Suckling, Richard Lovelace.

The religious poets: George Herbert, Francis Quarles, George Wither, Richard Crashaw, Henry Vaughan.

Abraham Cowley: *Poetical Blossoms,* 1633; *Pindarique Odes, The Davideis,* 1656.

John Milton: *Comus,* 1634; *Lycidas,* 1638; *Paradise Lost,* 1667; *Paradise Regained, Samson Agonistes,* 1671; sonnets, odes, essays.

John Evelyn: *Diary,* 1640-1704.

Robert Herrick: *Hesperides* and *Noble Numbers,* 1648.

Richard Baxter: *The Saints' Everlasting Rest,* 1650.

Jeremy Taylor: *Holy Living,* 1650; *Holy Dying,* 1651.

Thomas Hobbes: *Leviathan,* 1651; *Translation of the Iliad and the Odyssey,* 1675.

Izaak Walton: *The Compleat Angler,* 1653; biographical writings.

Samuel Pepys: *Diary,* 1660-69.

Samuel Butler: *Hudibras,* 1663, 1664, 1678.

Edmund Waller: *Poems,* 1664; *Divine Love,* 1685; *Fear of God,* 1686.

John Bunyan: *Grace Abounding,* 1666; *The Pilgrim's Progress,* 1678; *The Holy War,* 1682.

John Dryden: *Essay of Dramatic Poesy,* 1668; *Absalom and Achitophel,* 1681; *Alexander's Feast,* 1697.

William Wycherley: *The Gentleman Dancing Master,* 1671; *The Country Wife,* 1673.

John Locke: *Essay Concerning Human Understanding,* 1690.

William Congreve: *Love for Love,* 1695; *The Way of the World,* 1700.

Jeremy Collier: *Short View of the Profaneness and* ***Immorality*** *of the English Stage,* 1698.

1700-1800

Richard Steele: *The Christian Hero,* 1701; *The Tender Husband,* 1705; *Essays* in the *Tatler* (1709), *Spectator* and *Guardian* (1711-14).

Daniel Defoe: *Hymn to the Pillory,* 1703; *Robinson Crusoe,* 1719.

Joseph Addison: *The Campaign,* 1704; *Poems,* 1712; *Essays* in the *Tatler* (1709-11), *Spectator* (1711-14), *Guardian* (1713); political writings.

Jonathan Swift: *The Battle of the Books, A Tale of a Tub,* 1704; *Gulliver's Travels,* 1726.

Edward Hyde: *History of the Great Rebellion,* 1704-07.

Alexander Pope: *Essay on Criticism,* 1711; *Rape of the Lock,* 1712; *Essay on Man,* 1732-34.

John Gay: *The Shepherd's Week,* 1714; *Trivia,* 1715; *The Beggar's Opera,* 1728.

Allan Ramsay: *Scots Song,* 1719; *Poems,* 1721; *The Gentle Shepherd,* 1725; *Fables,* 1730.

James Thomson: *The Seasons,* 1726-30; *The Castle of Indolence,* 1748.

Samuel Johnson: *London,* 1738; *The Vanity of Human Wishes,* 1749; *The Rambler,* 1750-52; *Dictionary of the English Language,* 1755; *The Idler,* 1758-60; ***Rasselas,*** 1759; *Lives of the Poets,* 1779-81.

Samuel Richardson: *Pamela,* 1740; *Clarissa Harlowe,* 1748; *Sir Charles Grandison,* 1753.

Henry Fielding: *The Adventures of Joseph Andrews,* 1742; *History of Tom Jones,* 1749.

William Collins: *Persian Eclogues,* 1742; *Odes,* 1746, 1748, 1749.

Edward Young: *Night Thoughts,* 1742.

Mark Akenside: *Pleasures of the Imagination,* 1744; *Odes,* 1745.

Thomas Gray: *Odes,* 1747-48; *Elegy Written in a Country Churchyard,* 1751; *Pindaric Odes,* 1757.

Tobias Smollett: *Roderick Random,* 1748; *Peregrine Pickle,* 1751; *The Expedition of Humphrey Clinker,* 1771.

David Hume: *The History of England,* 1754-62; *The Natural History of Religion,* 1757.

Edmund Burke: *Vindication of Natural Society,* 1756; *On Conciliation with America,* 1775.

Laurence Sterne: *The Life of Tristam Shandy,* 1759-67; *Sentimental Journey Through France and Italy,* 1768.

Oliver Goldsmith: *The Citizen of the World,* 1760-61; *The Traveller,* 1764; *The Vicar of Wakefield,* 1766; *The Deserted Village,* 1770; *She Stoops to Conquer,* 1773.

James Macpherson: *Fragments of Ancient Poetry,* 1760; *Fingal,* 1762; *Temora,* 1763.

Thomas Chatterton: *Rowley Poems,* 1764-70.

Thomas Percy: *Reliques of Ancient English Poetry,* 1765.

Richard Sheridan: *The Rivals,* 1775; *The School for Scandal,* 1777; *The Stranger,* 1798.

Thomas Paine: *The American Crisis,* 1776; *The Age of Reason,* 1792-95.

Edward Gibbon: *Decline and Fall of the Roman Empire,* 1776-88.

William Cowper: *Olney Hymns,* 1779; *Truth,* 1782; *The Task,* 1785; *Translation of Homer,* 1791.

George Crabbe: *The Candidate,* 1780; *The Village,* 1783; *The Newspaper,* 1785.

William Blake: *Poetical Sketches,* 1783; *Songs of Innocence,* 1789; *Songs of Experience,* 1794.

James Boswell: *Journal of a Tour through the Hebrides,* 1785; *Life of Johnson,* 1791.

Robert Burns: *The Cotter's Saturday Night, To a Mouse, To a Daisy,* 1786; *Auld Lang Syne,* 1788; *To Mary in Heaven,* 1789; *Tam o'Shanter,* 1790; *Ye Banks and Braes,* 1792.

Ann Radcliffe: *The Mysteries of Udolpho,* 1794; *The Italian,* 1797.

AMERICAN LITERATURE	FOREIGN LITERATURE
1625-1700	
William Bradford: *History of Plymouth Plantation, 1602-47.*	
John Winthrop: *History of New England, 1630-49.*	
Bay Psalm Book, 1640; produced under the supervision of Richard Mather, Thomas Welde and John Eliot.	
Nathaniel Ward: *Simple Cobbler of Aggawam,* 1647.	
Anne Bradstreet: *Poems,* 1650.	
	Corneille: *Le Cid,* 1636.
	Descartes: *Principles of Philosophy,* 1644.
Michael Wigglesworth: *Day of Doom,* 1662.	
John Eliot: *Translation of the Bible* (into the Indian language), 1661-63.	
	Molière: *Tartuffe,* 1664; *The Misanthrope,* 1666; *L'Avare,* 1668.
	La Fontaine: *Fables,* 1668.
	Racine: *Iphigénie,* 1674; *Phèdre,* 1677; *Athalie,* 1691.
Cotton Mather: *The Ecclesiastical History of New England,* 1693-97.	Fénelon: *Télémaque,* 1699.
1700-1800	
	Le Sage: *Gil Blas,* 1715-35.
Benjamin Franklin: *Poor Richard's Almanac,* 1732-57; *Autobiography,* 1771, 1781, 1788.	Voltaire: *La Henriade,* 1724; *Zaïre,* 1732; *Candide,* 1757.
	Klopstock: *Der Messias,* 1748-73.
Jonathan Edwards: *Freedom of the Will,* 1754.	
Thomas Hutchinson: *History of Massachusetts Bay, 1628-1750,* 1760-67.	Rousseau: *La Nouvelle Héloïse,* 1760; *Contrat Social, Émile,* 1762.
James Otis: *The Rights of the Colonists Asserted and Proved,* 1764.	Wieland: *Translation of Shakespeare,* 1762-66; *Oberon,* 1780.
John Trumbull: *Progress of Dullness,* 1772-74; *M'Fingal,* 1774-82.	Lessing: *Laokoon,* 1766; *Minna von Barnhelm,* 1767; *Emilia Galotti,* 1772.
The Federalist; political essays written by Madison, Hamilton and Jay, 1787-88.	Goethe: *Sorrows of Werther,* 1774; *Wilhelm Meister, Part I,* 1795.
Joel Barlow: *The Vision of Columbus,* 1787; *The Hasty Pudding,* 1793.	Beaumarchais: *The Barber of Seville,* 1775; *The Marriage of Figaro,* 1784.
Timothy Dwight: *The Triumph of Infidelity,* 1788; *Greenfield Hill,* 1794.	Alfieri: *Cleopatra,* 1775; *Saul,* 1782.
Philip Freneau: *The Indian Burying-Ground, The Wild Honeysuckle, Eutaw Springs.*	Schiller: *The Robbers,* 1781; *Don Carlos,* 1787.
Joseph Hopkinson: *Hail Columbia,* 1798.	Saint-Pierre: *Paul and Virginia,* 1789.

ENGLISH LITERATURE

1800-1900

William Wordsworth: *Lyrical Ballads* (with Coleridge), 1798, 1800; *Michael,* 1800; *Sonnets,* 1802; *The Prelude,* 1895; *The Excursion,* 1814.

Samuel T. Coleridge: *The Ancient Mariner,* 1798; *Translation of Wallenstein,* 1800; *Ode to Dejection,* 1802; *Biographia Literaria,* 1817.

Maria Edgeworth: *Castle Rackrent,* 1800; *Leonora,* 1806; *Ormond,* 1817.

Robert Southey: *Thalaba,* 1801; *Madoc,* 1805; *The Curse of Kehama,* 1810; *Life of Nelson,* 1813.

Thomas Campbell: *Poems,* 1803; *Gertrude of Wyoming,* 1809.

Sir Walter Scott: *The Lay of the Last Minstrel,* 1805; *Marmion,* 1808; *The Lady of the Lake,* 1810; *Waverley,* 1814; *The Heart of Midlothian,* 1817; *Ivanhoe,* 1819; *Kenilworth,* 1821.

Lord Byron: *Hours of Idleness,* 1807; *Childe Harold's Pilgrimage,* 1812; *Manfred,* 1817; *Don Juan,* 1819-24.

Charles Lamb: *Tales from Shakespeare,* 1807; *Essays of Elia,* 1820-22, 1823.

Thomas Moore: *Irish Melodies,* 1807-34; *Lalla Rookh,* 1817.

Jane Austen: *Sense and Sensibility,* 1811; *Pride and Prejudice,* 1812; *Emma,* 1816; *Persuasion,* 1818.

Percy B. Shelley: *Queen Mab,* 1813; *Alastor,* 1816; *Prometheus Unbound,* 1820; *Adonais,* 1821.

John Keats: *Poems,* 1817; *Endymion,* 1818; *Lamia, The Eve of St. Agnes, and Other Poems,* 1820.

William Hazlitt: *English Poets,* 1818; *Dramatic Literature of the Age of Elizabeth,* 1821; *Life of Napoleon,* 1828-30.

Thomas De Quincey: *Confessions of an English Opium-Eater,* 1821; *Sketches of Life and Manners,* 1834-41.

Walter S. Landor: *Imaginary Conversations,* 1824-53; *Pericles and Aspasia,* 1836; *Pentameron,* 1837.

Thomas B. Macaulay: *Essay on Milton,* 1825; *Lays of Ancient Rome,* 1842; *History of England,* 1849-56.

Edward Bulwer Lytton: *Eugene Aram,* 1831; *The Last Days of Pompeii,* 1834; *Rienzi,* 1835; *My Novel,* 1853.

Alfred Tennyson: *The Palace of Art, The Lady of Shalott,* 1832; *The Princess,* 1847; *In Memoriam,* 1850; *Idylls of the King,* 1859-72; *Becket,* 1884; *Crossing the Bar,* 1889.

Thomas Carlyle: *Sartor Resartus,* 1833; *The French Revolution,* 1837; *Heroes and Hero Worship,* 1841.

Robert Browning: *Paracelsus,* 1834-35; *Pippa Passes,* 1841; *A Blot in the 'Scutcheon,* 1843; *The Ring and the Book,* 1868-69.

Charles Dickens: *The Pickwick Papers,* 1836-37; *Oliver Twist,* 1837-38; *Nicholas Nickleby,* 1838-39; *David Copperfield,* 1849-50; *A Tale of Two Cities,* 1859; *Our Mutual Friend,* 1864-65.

John H. Newman: *Tracts for the Time,* 1841; *Apologia pro Vita Sua,* 1864; *Verses,* 1868.

John Ruskin: *Modern Painters,* 1843-60; *Sesame and Lilies,* 1865; *Crown of Wild Olive,* 1866.

William M. Thackeray: *Vanity Fair,* 1846-48; *Henry Esmond,* 1852; *English Humorists,* 1853; *The Newcomes,* 1854-55.

Charlotte Brontë: *Jane Eyre,* 1847; *Shirley,* 1849; *Villette,* 1853; *The Professor,* 1857.

Charles Kingsley: *Alton Locke,* 1849; *Hypatia,* 1853; *Westward Ho,* 1855; *The Water Babies,* 1863.

Charles Reade: *Peg Woffington,* 1852; *The Cloister and the Hearth,* 1860; *Put Yourself in His Place,* 1870.

Anthony Trollope: *The Warden,* 1855; *Barchester Towers,* 1857; *Framley Parsonage,* 1861; *The Last Chronicle of Barset,* 1867.

Mathew Arnold: *Poems,* 1855; *On Translating Homer,* 1861; *Culture and Anarchy,* 1869; *Literature and Dogma,* 1873.

Elizabeth B. Browning: *Sonnets from the Portuguese,* 1856; *Aurora Leigh,* 1856; *Last Poems,* 1862.

George Eliot: *Scenes of Clerical Life,* 1858; *Adam Bede,* 1859; *Silas Marner,* 1861; *Romola,* 1863; *Middlemarch,* 1871-72.

George Meredith: *The Ordeal of Richard Feverel,* 1859; *The Egoist,* 1879; *Diana of the Crossways,* 1885.

Algernon C. Swinburne: *Atalanta in Calydon,* 1864; *Poems and Ballads,* 1866; *Essays and Studies,* 1875.

Dante G. Rossetti: *Poems,* 1870.

Thomas Hardy: *Far from the Madding Crowd,* 1874; *The Return of the Native,* 1878; *Tess of the D'Urbervilles,* 1891.

Robert L. Stevenson: *Treasure Island,* 1883; *Kidnapped,* 1886; *David Balfour,* 1893; *The Ebb Tide,* 1893.

Rudyard Kipling: *Plain Tales from the Hills,* 1887; *The Light that Failed,* 1891; *The Jungle Book,* 1894; *Kim,* 1901; *Rewards and Fairies,* 1910.

AMERICAN LITERATURE

1800-1900

Charles B. Brown: *Arthur Mervyn* and other novels, 1799-1804.

Washington Irving: *Knickerbocker History of New York,* 1809; *Sketch Book,* 1819-20; biography and other prose.

William C. Bryant: *Thanatopsis,* 1817; *To a Waterfowl,* 1818; *The Ages,* 1821; addresses, essays.

James F. Cooper: *The Spy,* 1821; *Leather-Stocking Tales,* 1826-41.

Edgar A. Poe: *Tamerlane,* 1827; *The Raven,* 1845; tales.

John G. Whittier: *Legends of New England,* 1831; *Songs of Labor,* 1850; *Snow-Bound,* 1866.

Henry W. Longfellow: *Outre-Mer,* 1835; *Voices of the Night,* 1839; *Evangeline,* 1847; *Hiawatha,* 1855; *Miles Standish,* 1858; *Ultima Thule,* 1880.

George Bancroft: *History of the United States,* 1834-84.

Ralph W. Emerson: *Nature,* 1836; essays, poetry.

Oliver W. Holmes: *Poems,* 1836, 1846, 1850; *Autocrat* essays, 1857-90.

Nathaniel Hawthorne: *Twice-Told Tales,* 1837, 1842, 1852; *The Scarlet Letter,* 1850; *Tanglewood Tales,* 1853; *The Marble Fawn,* 1860.

William H. Prescott: *Reign of Ferdinand and Isabella,* 1838.

James R. Lowell: *A Year's Life,* 1841; *Biglow Papers, A Fable for Critics,* 1848; *Commemoration Ode,* 1865; *My Study Windows,* 1871.

Bayard Taylor: *Views Afoot,* 1846; *Translation of Faust,* 1870-71; poems.

Francis Parkman: *The Conspiracy of Pontiac,* 1851.

Harriet B. Stowe: *Uncle Tom's Cabin,* 1852.

Henry D. Thoreau: *Walden,* 1854; *The Maine Woods,* 1864.

Walt Whitman: *Leaves of Grass,* 1855; *Democratic Vistas,* 1870.

John Motley: *Rise of the Dutch Republic,* 1861.

Julia Ward Howe: *Battle Hymn of the Republic,* 1861.

Bret Harte: poetry and tales of the West, 1867-1901.

Mark Twain: *Innocents Abroad,* 1869; *Tom Sawyer,* 1876; *Huckleberry Finn,* 1885.

Thomas B. Aldrich: *Story of a Bad Boy,* 1870.

Joaquin Miller: *Songs of the Sierras,* 1871; *Songs of Italy,* 1878.

William D. Howells: *A Chance Acquaintance,* 1872; *A Modern Instance,* 1883; *The Rise of Silas Lapham,* 1885; poetry and criticism.

John Fiske: historical and philosophical writings, 1874-99.

Henry James: *Daisy Miller,* 1878; *The Bostonians,* 1886; essays.

Frank Stockton: *Rudder Grange,* 1879; *The Hundredth Man,* 1887.

George W. Cable: *Old Creole Days,* 1879; *The Grandissimes,* 1880.

Joel C. Harris: *Uncle Remus, His Songs and Sayings,* 1880.

Sidney Lanier: *The Science of English Verse,* 1881; poems.

F. Marion Crawford: *Dr. Claudius,* 1883; *Via Crucis,* 1899.

Eugene Field: *With Trumpet and Drum,* 1892; essays.

FOREIGN LITERATURE

Schiller: *Maria Stuart,* 1800; *Wilhelm Tell,* 1804.

Chateaubriand: *Atala,* 1801; *René,* 1805.

Goethe: *Faust, Part I,* 1808; *Part II,* 1833.

Fouqué: *Undine,* 1811.

Grimm Brothers: *Fairy Tales,* 1812.

Uhland: *Fatherland Stories,* 1816.

Heine: *Gedichte,* 1822.

Tegnér: *Frithjof's Saga,* 1825.

Hugo: *Cromwell,* 1827; *Odes and Ballads,* 1829; *Hernani,* 1830; *Notre Dame,* 1831; *Les Miserables,* 1862.

Runeberg: *The Elk-Hunters,* 1832.

Balzac: *Eugénie Grandet,* 1833; *Père Goriot,* 1834.

Strauss: *Life of Jesus,* 1835.

Andersen: *Fairy Tales,* 1835.

Bremer: *The Neighbors,* 1837; *Hertha,* 1856.

Dumas: *Monte Cristo,* 1841-15; *The Three Musketeers,* 1844.

Sand: *Consuelo,* 1842.

Björnson: *Arne,* 1858; *Sigurd the Bastard,* 1862.

Turgeniev: *Fathers and Sons,* 1862.

Renan: *Life of Jesus,* 1863.

Taine: *History of English Literature,* 1864.

Braga: *Vision of the Ages,* 1864.

Tolstoy: *War and Peace,* 1864-69; *Anna Karenina,* 1873.

Dostoyevski: *Crime and Punishment,* 1866.

Frechette: *The Voice of an Exile,* 1869.

Verne: *Around the World in Eighty Days,* 1872.

Heyse: *Children of the World,* 1873.

Boyesen: *Gunnar,* 1874; *Idyls of Norway,* 1882.

Ibsen: *Pillars of Society,* 1877; *A Doll's House,* 1879; *Ghosts,* 1881.

Zola: *Nana,* 1880; *Le Rêve,* 1888.

Strindberg: *The New Kingdom,* 1882.

Halévy: *L'Abbé Constantin,* 1882.

Maupassant: *A Life,* 1883.

Daudet: *Sapho,* 1884.

Nietzsche: *Beyond Good and Evil,* 1886; *Poems and Aphorisms,* 1898.

Campbell: *Lake Lyrics and Other Poems,* 1889.

Du Maurier: *Peter Ibbetson,* 1891; *Trilby,* 1894.

Sudermann: *Dame Care,* 1892; *The Joy of Living,* 1902.

Hauptmann: *The Weavers,* 1892.

Sienkiewicz: *Quo Vadis,* 1895.

Parker: *The Seats of the Mighty,* 1896; *The Right of Way,* 1901.

Lagerlöf: *Miracles of Antikrist,* 1897.

Rostand: *Cyrano de Bergerac,* 1897; *L'Aiglon,* 1900; *Chantecler,* 1910.

Connor: *The Sky Pilot,* 1899; *The Doctor,* 1906.

ENGLISH LITERATURE

1900

Sir Arthur Quiller-Couch: *The Oxford Book of English Verse,* 1900; *The White Wolf,* 1902; *News from the Duchy,* 1914.

Maurice Hewlett: *New Canterbury Tales,* 1901; *The Queen's Quair,* 1904; *The Half-way House,* 1908; *The Agonists,* 1911; *Bendish: A Study in Prodigality,* 1913.

Hall Caine: *The Eternal City,* 1901; *The Prodigal Son,* 1904; *The White Prophet,* 1909.

Henry A. Jones: *Chance the Idol,* 1902; *The Hypocrites,* 1907; *Mary Goes First,* 1914.

Arnold Bennett: *Anna of the Five Towns,* 1902; *The Old Wives' Tale,* 1908; *Clayhanger,* 1910; *The Price of Love,* 1914.

William B. Yeats: *Cathleen ni Hoolihan,* 1902; *In the Seven Woods,* 1903.

A. Conan Doyle: *The Hound of the Baskervilles,* 1902; *The Return of Sherlock Holmes,* 1905; *The Fires of Fate,* 1909; *The House of Temperley,* 1909; *The Lost World,* 1912.

Bernard Shaw: *Man and Superman,* 1903; *Misalliance,* 1910; *Fanny's First Play,* 1911; *Pygmalion,* 1912.

James Barrie: *Quality Street,* 1903; *Peter Pan,* 1904; *Alice Sit by the Fire,* 1905; *What Every Woman Knows,* 1908; *Peter and Wendy,* 1911; *The Legend of Leonora,* 1913.

Joseph Conrad: *Romance,* 1903; *The Mirror of the Sea,* 1906; *Under Western Eyes,* 1911; *Chance,* 1914.

Herbert G. Wells: *Mankind in the Making,* 1903; *A Modern Utopia,* 1905; *The War in the Air,* 1908; *Marriage,* 1912; *The World Set Free,* 1914.

Alfred Noyes: *The Flower of Old Japan,* 1903; *The Enchanted Island and Other Poems,* 1909.

Mrs. Humphry Ward: *Lady Rose's Daughter,* 1903; *Diana Mallory,* 1908; *The Case of Richard Meynell,* 1911; *The Coryston Family,* 1913; *Delia Blanchflower,* 1914.

Gilbert K. Chesterton: *Heretics,* 1905; *Dickens,* 1906; *The Man who was Thursday,* 1908; *The Innocence of Father Brown,* 1911; *Manalive,* 1912; *The Flying Inn,* 1914.

Edward V. Lucas: *A Wanderer in Holland,* 1905; *Over Bemerton's,* 1908; *Old Lamps for New,* 1911; *London Lavender,* 1912; *The Loiterer's Harvest,* 1913; *Landmarks,* 1914.

E. Temple Thurston: *The Apple of Eden,* 1905; *The Garden of Resurrection,* 1911; *The Antagonists,* 1912; *Richard Furlong,* 1913; *Achievement,* 1914.

William De Morgan: *Joseph Vance,* 1906; *Alice-for-Short,* 1907; *It Never Can Happen Again,* 1909; *When Ghost Meets Ghost,* 1913.

John Galsworthy: *The Silver Box,* 1906; *Joy,* 1907; *Strife,* 1909; *Fraternity,* 1909; *Justice,* 1910.

Anthony Hope Hawkins: *Tales of Two People,* 1907; *The Great Miss Driver,* 1908; *Mrs. Maxon Protests,* 1911.

Sir Arthur Pinero: *The Thunderbolt,* 1908; *Mid-Channel,* 1909.

Leonard Merrick: *Lynch's Daughter,* 1908; *A Daughter of the Philistines,* 1912.

Lady Gregory: *Spreading the News, The Rising of the Moon, The Workhouse Ward,* 1909; *The Kiltartan Wonder Book,* 1911.

John Masefield: *The Tragedy of Nan,* 1909; *The Story of a Round House and Other Poems,* 1912.

AMERICAN LITERATURE	FOREIGN LITERATURE
1900	
Irving Bacheller: *Eben Holden,* 1900; *Darrel of the Blessed Isles,* 1903; *Keeping Up With Lizzie,* 1911; *Charge It,* 1912; *The Turning of Griggsby,* 1913.	D'Annunzio: *The Flame of Life,* 1900; *Francesca da Rimini,* 1902.
Hamlin Garland: *The Eagle's Heart,* 1900; *The Long Trail,* 1907; *Victor Olnee's Discipline,* 1911.	Carman: *Last Songs from Vagabondia,* 1900.
Owen Wister: *The Virginian,* 1902; *Lady Baltimore,* 1906; *Members of the Family,* 1911.	Gorky: *The Peasant,* 1900.
Richard H. Davis: *Ranson's Folly,* 1902; *The Bar Sinister,* 1904; *The Lost Road,* 1913.	Ferrero: *The Greatness and Decline of Rome,* 1902.
Henry Van Dyke: *The Blue Flower,* 1902; *Collected Poems,* 1911.	
Thomas N. Page: *Gordon Keith,* 1903; *John Marvel, Assistant,* 1909; *The Land of the Spirit,* 1913.	France: *The Sign of the Reine Pedauque,* 1903.
Hamilton W. Mabie: *Backgrounds of Literature,* 1903; *American Ideals of Character and Life,* 1913.	
Kate Wiggin Riggs: *Rebecca of Sunnybrook Farm,* 1903; *Mother Carey's Chickens,* 1911.	
Jack London: *Call of the Wild,* 1903; *The Sea-Wolf,* 1904; *John Barleycorn,* 1913; *The Strength of the Strong,* 1914; *The Mutiny of the Elsinore,* 1914.	
F. Hopkinson Smith: *Col. Carter's Christmas,* 1904; *Peter,* 1908; *In Thackeray's London,* 1913.	
Edith Wharton: *The House of Mirth,* 1905; *The Reef,* 1912; *The Custom of the Country,* 1913.	
Winston Churchill: *Coniston,* 1906; *A Modern Chronicle,* 1910; *The Inside of the Cup,* 1913.	Fogazarro: *The Saint,* 1906.
Margaretta Deland: *The Awakening of Helena Richie,* 1906; *The Iron Woman,* 1911; *The Voice,* 1912; *Partners,* 1913.	
Mary Wilkins Freeman: *By the Light of the Soul,* 1907; *The Winning Lady,* 1909; *The Green Door,* 1910; *The Copy Cat and Other Stories,* 1914.	
James W. Riley: *The Little Orphant Annie Book,* 1907.	Roberts: *In the Deep of the Snow,* 1907.
Harold B. Wright: *The Shepherd of the Hills,* 1907; *The Winning of Barbara Worth,* 1912; *The Eyes of the World,* 1914.	Service: *Songs of a Sourdough,* 1907; *The Trail of '98,* 1910.
Frances H. Burnett: *The Shuttle,* 1907; *The Secret Garden,* 1909; *T. Tembarom,* 1913.	
John Fox, Jr.: *The Trail of the Lonesome Pine,* 1908; *The Heart of the Hills,* 1913.	Zangwill: *The Melting Pot,* 1908; *The War God,* 1911.
James Lane Allen: *The Bride of the Mistletoe,* 1909; *A Heroine in Bronze,* 1912.	Maeterlinck: *The Blue Bird,* 1909.
Ella W. Wilcox: *Poems of Progress and New Thought Pastels,* 1909; *Picked Poems,* 1912.	Bergson: *Time and Free Will,* 1910; *Creative Evolution,* 1911; *Dreams,* 1914.
William A. White: *A Certain Rich Man,* 1909.	Hopkins: *Life of King Edward VII,* 1910.
Kathleen Norris: *Mother,* 1911; *The Treasure,* 1914; *Saturday's Child,* 1914.	Tagore: *The Crescent Moon,* 1913; *The Gardener,* 1913; *The Realization of Life,* 1913.

Lith'ium, a widely distributed element found in mica, feldspar, mineral and sea waters and in some plants, notably the tobacco and the beet. It is a silver-white metal, easily distinguished by the bright crimson flame which it produces. Lithium carbonate is especially noted for its power to dissolve uric acid, and mineral springs containing this salt are frequently recommended to persons suffering from gout and rheumatism.

Lithography, *Li thog' ra fy,* the art of printing from prepared stones. The stone employed is known as a lithograph stone, and is a fine-grained limestone of a very porous nature, having usually a light gray color. The best stones are obtained in Bavaria, where the art was invented in 1796 by Senefelder. These limestones absorb grease and water rapidly; therefore, if a line is drawn on a prepared stone with an ink containing grease, this line can be taken away only by removing the surface to the depth to which the grease has penetrated. If water is now placed on this stone, the water will remain only on those parts not covered by the grease. When a roller carrying a greasy ink is passed over the stone, the ink will cover only the greased portions, and the parts that are wet will not take up the ink. A piece of paper pressed upon the stone will receive an impression in ink from the lines drawn. On these principles depend lithography. Aluminum plates and those made of an alloy of zinc are frequently substituted for lithograph stones. See ENGRAVING; ZINC ETCHING.

Lithuania, a section of country comprising the former Russian provinces of Vilna Konov, Grodno, and Suwalki, and parts of Minsk and Vitebsk in West Russia. It faces New Poland all along its northeastern and much of its eastern frontier; located south of Latvia. Lithuania is another instance of a long submerged people resuming national life as a result of the vast political changes effected by the World War.

In 1325 Lithuania united with Poland and the combined states formed the most powerful nation of the day. Its sway extended from the Vistula on the west, to the Valley of the Dnieper on the east; from the Baltic to the Black Sea; and Lithuania gave as much as Poland to the union. Since that date her history has been that of Poland; and at the partitions of Poland, her territory passed under the control of Russia. A comparative study of languages and ethnology discloses wonderfully interesting glimpses of a prehistoric past, when the Lithuanian people were dwelling near the primitive homeland of the Aryan people, with their ethnic brethren, the ancient Greeks and Romans. A great invading wedge, so to speak, of Slavonic people separated these branches and confined the Lithuanian tribes in the unfavorable sections,—forest-covered, morass-strewn and lake-dotted—where they have since resided.

The northern branch of these separated people consisted of three closely related branches; the Borussi, who settled in East Prussia and gave their name to the province and Prussian people; the Letts, who settled in Courland and Livonia; and the Lithuanians.

At the conclusion of the World War a republic of Lithuania was proclaimed. Its area and future political status cannot now be stated. (See BREST LITOVSK.)

Little Rock, Ark., the capital of the state and the county seat of Pulaski Co., situated in the central part of the state, on the Arkansas River and on the St. Louis, Iron Mountain & Southern, the Chicago, Rock Island & Pacific, the St. Louis Southwestern and other railroads, about 350 m. n. of New Orleans. Little Rock is situated upon a high rocky bluff overlooking the river and is surrounded by the foothills of the Ozarks. The city itself is on a comparatively level situation fully 50 ft. above the river, which is here crossed by several bridges. The city has 40 m. of paved streets and 35 m. of street-car lines. An excellent park system includes within the city Forest Park, City Park, West End Park and Wonderland; aside from these there are many attractive natural parks along the river. Little Rock has many state insti-

tutions with excellent buildings and spacious grounds. Among these may be mentioned the state capitol, a fine city building, the state asylum for the insane, the state deaf-mute institute, the state school for the blind, a state reform school, the penitentiary, a new courthouse and the state library. Aside from these there is a Carnegie library, built in 1908, the Old Ladies' Home, Florence Crittenton Rescue Mission, a United States arsenal, St. Vincent's Infirmary, a Masonic Temple, a Y. M. C. A. Building, several hospitals, one of which is especially for the treatment of nervous diseases, a children's home and a courthouse for the Federal District Court.

Little Rock has one of the finest public school systems in the Southwest, with an investment of more than $1,000,000 in buildings and equipment, and a school enrollment which reaches 8000. In addition to public schools the law and medical departments of the state university are located here, as well as Little Rock College, St. Mary's Academy, Philander Smith College, Arkansas Baptist College and the Supreme Court and Collegiate libraries.

Cotton and lumber furnish the products for the chief industries; cottonseed oil and cake and planing-mill products are exported in large quantities. Printing and publishing, furniture manufacture and machine making come next in importance, and just recently packing houses and stockyards have been established. Valuable deposits of bauxite occur in the county, and Little Rock is the shipping point for the ore. Little Rock was originally an Indian settlement. White people first settled there in 1814. In 1821 the town was incorporated and it became the capital of Arkansas in 1836. In the Civil War the city was Confederate in its sympathies, and its United States arsenal was seized by the state. Later the city was taken by Federal authorities and remained in their hands until the close of the war. Little Rock had the first newspaper published west of the Mississippi. Population in 1920, U. S. census, 64,997.

Live-Forever. See HOUSELEEK.

Liv'er, a large glandular organ in the body of the Vertebrates. In man it is situated in the upper part of the abdominal cavity immediately below the diaphragm, and lies rather more to the right than to the left. It is of irregular shape, generally flat, broad and thicker on the right side. Its weight is about four pounds. The lower end is divided into five lobes, two large and three small (minor) lobes, and its upper surface is arched and fits into the concave underside of the diaphragm. The liver is of a soft and easily crumbled material, and is dark reddish-brown in color. Its function is important. It secretes the bile necessary for digestion (See BILE); it receives all the blood from the stomach and intestines; destroys the worn-out red corpuscles (see BLOOD); and takes from the blood its excess of sugar and stores it away in the form of starch, called glycogen. Bile is carried from the liver through the hepatic duct to the gall bladder, a small, elongated sac, on the underside of the liver, where it is kept in storage to be poured out through the hepatic and cystic ducts into a common bile duct, which empties it into the duodenum during the process of digestion. Arterial blood, which nourishes the liver, is carried to it from the aorta through the hepatic artery. Venous blood from the stomach, intestines, pancreas and spleen, from which it takes certain impurities, is carried to the liver through the portal vein, and carried from it through the hepatic veins and inferior vena cava to the heart. In the absence of food the store of glycogen is the first to be drawn upon to furnish the fuel supply of the body. See DIGESTION.

Liv'ermore, Mary Ashton Rice (1821-1905), an American lecturer and reformer, born in Boston, daughter of Timothy Rice. She was educated at the Charlestown Female Seminary, taught school, and married Rev. D. P. Livermore, a Universalist minister and anti-slavery lecturer. During the Civil War Mrs. Livermore became the Northwestern agent of the United States Sanitary

Commission. She was active in the anti-slavery, temperance and women's suffrage movements. In 1870-71 she was editor of the *Woman's Journal* of Boston, and was for many years president of the Massachusetts Woman's Christian Temperance Union. She was a popular lecturer and the author of several books.

Liv'erpool, a city and seaport of England, situated on the right bank of the estuary of the Mersey, about 3 m. from the open sea and 201 m. by rail n.w. of London. It is the second city of England and the third of the United Kingdom. The climate is healthful, and the portions of the city that are built on the highlands back from the low quarters along the river are attractive. It extends in a semicircle along the bend of the Mersey, the docks and wharves stretching out several miles.

Streets, Parks and Public Buildings. The streets lead from the water front up the slopes to a height of 250 ft. They are lined with attractive buildings, built chiefly of stone, and some of the handsome stores, general public edifices and palatial offices are among the finest in the world. The parks include the Wavertree (with which are connected the botanic gardens), Calderstones, Newsham, Sheil and Stanley, an area in all of about 100 acres. One of the finest buildings is St. George's Hall, a combination of a hall for the triennial music festivals, and law courts for the assizes. In its spacious audience room is one of the largest organs in the world. Among other buildings are the New Law Courts, the Free Library and Museum, the Walker Fine Art Gallery, several theaters, the Philharmonic Hall, the Picton Lecture Hall, the Exchange, the revenue buildings, the post office, the Royal Institution, the Liverpool University, St. Francis Xavier's College and several technical and art schools. Liverpool was the first city in England to maintain municipal baths, adopting the system in 1794. The establishments are well equipped and over 1,000,000 of the inhabitants patronize them.

Commerce and Industries. The docks of Liverpool, a striking feature, are owned by the Mersey Docks and Harbor Board. They contain over 24 m. of wharfage. The great landing stage, known as the George's stage and the Prince's stage, supported on floating pontoons and connected by bridges with the river wall, is 2487 ft. in length and 80 ft. in breadth. The foreign trade of Liverpool is large, especially the intercourse with North America. Its fleet of merchant vessels is larger than that of any other seaport. The leading import is cotton. Next follow grain, flour, tobacco, cattle, timber, raw sugar, wool and leather. Iron and steel manufactures, pig iron, machinery and cotton goods are exported. The industries are represented by large shipbuilding yards, engineering works, pottery and china manufactures, sugar refineries, confectionery works, oil-pressing and cattle-cake mills, iron and brass foundries, corn mills and breweries.

Government and History. The city returns nine members to Parliament, is divided into 16 districts or 35 wards and has 103 councilors and 34 aldermen. There were colonies of Norsemen on both sides of the Mersey River in the eighth century. Liverpool received a charter of incorporation in 1229. A century later the black death, passing over the city, caused a large decrease in population, and there was no material advancement in the growth before 1600. After the Restoration the commerce developed rapidly with the growth of the manufacturing industries of south Lancashire and the beginning of trade with the West Indies and America. By 1730 the city was actively engaged in the slave trade, profiting by its proceeds as well as by that of privateering. In 1830 the first important steam railroad in the world went into operation between Liverpool and Manchester. Population, 763,926.

Liv'erworts", a class of flowerless plants related to the mosses but differing from them in their method of reproduction. In general they are leaflike plants

growing in moist, swampy situations or in the water. They are characterized by having flat bodies which, unlike those of lower forms of plants, have distinct upper and lower surfaces and well-marked bases and apexes; the latter form the growing point of the plant and the former produce a cluster of rootlike appendages often from one to two inches in length. Some of the liverworts produce, near the so-called midrib of the plant, a stalked fruiting body, bearing the spores by which the plant is reproduced. Other liverworts reproduce by the formation of an egglike body, containing spores which, in time, grow into plants like the parent lichen.

The liverworts were so named because their lobed bodies, generally brown in color, were supposed to resemble the human liver. They must not be confused with the flowering plant hepatica, or liverwort, of the Crowfoot Family, which also received its name from its liverlike, three-lobed leaf.

Liv'ingston, Robert R. (1746-1813), an American statesman, born in New York City and educated at King's College (now Columbia). He was admitted to the bar in 1773 and attained great success in his profession. Elected to the Continental Congress, he was chosen one of the committee of five to draw up a declaration of independence. In 1777 Livingston assisted in framing the constitution of New York State, and became chancellor of New York, an office which he held until 1801, and by virtue of which he administered the oath of office to George Washington when he was inaugurated first president of the United States. In 1781-83 Livingston was secretary of foreign affairs. He was in favor of the Federal Constitution and took an active part in securing its ratification by the New York State Convention in 1788. In 1801 he became minister to France, and acted with James Madison in negotiating the purchase of Louisiana in 1803. Later he traveled extensively in Europe, where he met Robert Fulton, whom he assisted in his experiments with steam navigation. He was the principal founder of the American Academy of Fine Arts in Boston, and was its first president. Benjamin Franklin called him the "Cicero of America."

Livingstone, David (1813-1873), an African traveler and missionary, born at Blantyre, in Lanarkshire, Scotland. At ten he entered a cotton factory, where he worked hard for years; but he managed to acquire a knowledge of Latin and Greek, besides pursuing a course of medicine at Glasgow University and attending some theological lectures of the Scotch Independents. Thereupon he offered himself to the London Missionary Society, by which he was ordained medical missionary in 1840. That summer he landed at Port Natal, South Africa. Here he became acquainted with Robert Moffat, with whom he was associated for nine years and whose daughter he married. Livingstone learned from the natives that there was a large lake to the north of the Kalahari Desert, and, exploring the region, discovered Lake Ngami in August, 1849. Three years later he explored the upper lakes of the Zambesi River and crossed the continent to Loanda, consuming about 18 months in the journey. In September, 1854, he left Loanda for his return across the continent, arrived safely at Linyante and proceeded thence along the Zambesi to the Indian Ocean, which he reached May 20, 1856. He then returned to England, where he was enthusiastically received. In 1857 he published his *Missionary Travels and Researches in South Africa.*

The following year, while commanding an exploring expedition in eastern and central Africa, Livingstone discovered lakes Shirwa and Nyassa. In 1865 he revisted the interior of Africa, and from then until his death zealously explored, mainly to the west of Nyassa and Tanganyika, where he discovered lakes Mweru and Bangweolo. For three years he was cut off from communication with the outside world, and fears for his safety were not set at rest until it was known that in November, 1871,

he had been visited at Ujiji by Henry M. Stanley of the New York *Herald*. After four months' companionship, Stanley proceeded to Zanzibar, and Livingstone went to the southern end of Lake Tanganyika; but, after wandering about for another year, he died near Lake Bangweolo. He was buried in Westminster Abbey. Besides the account of his missionary travels and researches, he wrote *The Zambesi and Its Tributaries*. Consult Stanley's *How I Found Livingstone*.

Livonia. See LATVIA and ESTHONIA.

Liv'y (Titus Livius) (59 B. C.-A. D. 17), a Roman historian, born at Patavium, in Venetia. He lived chiefly in Rome, and between B. C. 29 and 25 he began to write his extensive history of Rome, the plan of which allowed for 142 volumes. Only 35 of these are extant. He was not always accurate in his statements; nor was he critical. In the preface to the stupendous work he outlines his plan to record the history of the Roman people from the beginning, the nation that was "the first in the world." Therefore, he is not concerned with writing for students, nor with intensive investigations, but in a charming style he records the passing glories of Rome, and with a patriot's zeal turns from the evils of his own day and dwells on the great lessons of the past.

Liz'ard, an order of Reptiles comprising many families and varying widely in habits and structure. There are tiny, wormlike lizards which have no visible limbs and, from superficial observation alone, would be classed among the snakes, and there are large, powerful animals which rival the crocodiles in size. Their peculiar characteristics are: a long body, generally flattened; a protruding head; eyes that have movable eyelids or, rarely, are protected by a thin fold of skin; a distinct neck; and four sprawling limbs which generally have five long claws. Their food consists of insects which are caught by means of a more or less cleft tongue that can be extended to a length often exceeding that of the reptile itself.

The tail of the lizard is probably its most interesting feature. It is frequently a strong and powerful member and generally of great length. In some species it is the storehouse of extra nourishment taken up by the animal. In all species, however, the lizard seems to have the peculiar power of detaching it in time of danger. After such a method of self-preservation the lizard retires to the crevice of a rock from which it issues, in the course of a few months, with a new tail, which, though shorter and less powerful than its previous one, is nevertheless equally efficacious in preserving its owner from capture.

The lizards generally reproduce by means of eggs but in a few species the young are born alive. Some, too, as the chameleon, have the power of changing the color of their coats.

Lizards are distributed throughout all parts of the temperate and tropical zones but are most common in the warmer countries. They comprise one of the largest classes of Reptiles. See BASILISK; CHAMELEON; GILA MONSTER; GLASS SNAKE; HORNED TOAD; IGUANA; SKINK; GECKO.

Llama, *Lah' ma,* a South American member of the Camel Family, often called the American camel. It is smaller and less strong than its desert kin, has no hump and is particularly distinguished for its parted hoof, which renders it sure footed upon mountain paths. The males have long been used by the South American Indians as burden-bearers, but they are particular animals and insist upon grazing as they go and refuse to travel if the load be too heavy; when resting they make a peculiar humming noise like the note of a bee. The females furnish milk and meat. The Indians are fond of their llamas, decorating them with ribbons or bells and offering humble apologies if the load is large. The use of mules, horses and railroads in South America has driven the llama up the Andes, where it continues to be the surest means of transportation.

Llanos, *Lah' nos,* a local name for the treeless plains or prairies of South America. Specifically the term applies

to a level area in Venezuela and Colombia between the outlying spurs of the Andes on the west and the Orinoco on the east. This region is about 150,000 sq. m. in extent and lies only a few hundred feet above sea level. The lower portions, extended to the forested areas of the Amazon, are flat and subject to inundation during the rainy season, and they produce an abundant growth of grass; while the upper llanos are broken by undulations of low hills. The climate is hot and moist, and parts of the region are malarial.

Lloyd-George, David (1863-), a British statesman, born at Manchester. He was educated in Wales, became a solicitor in 1884 and entered Parliament for Carnarvon Boroughs in 1890. Acquiring a reputation as a leader of the Radicals, he rapidly gained prominence, and after the victory of the Liberals in 1906, he was chosen president of the Board of Trade. In this capacity he distinguished himself by settling the cotton workers' strike, wherein 300,000 persons were involved, and in averting the threatened railway strike.

During the World War his abilities were signally displayed as minister in charge of Munitions production. Only the wonderful increase in production that he made possible enabled the Entente Allies to win the war. Becoming prime minister late in 1916, he was from that time on one of the great leaders to whose energy and resourcefulness was due the successful conclusion. He was the head of the British Commission at the International Peace Council at Paris in 1919 and, as such, took an active part in framing the Treaty of Peace that closed the war.

Lloyd's, a British association, incorporated in 1871, which includes merchants, shipowners and ship brokers, insurance brokers and underwriters. Its headquarters are in the Royal Exchange, London, but throughout the world it maintains a marvellously efficient intelligence department which collects information of the greatest importance to all maritime interests. It has its own signal stations and telegraph lines, and since 1896, the masters of all British ships are required to notify Lloyd's concerning every derelict vessel sighted. This and other valuable information is published by the association, which issues a daily, *Lloyd's List,* the oldest London paper except the *Gazette. Lloyd's Register,* an annual publication, is a storehouse of information concerning the classification of ships, their construction, age, equipment, condition, etc. Lloyd's had its origin as early as 1688 in the natural gathering of merchants and shipowners at a coffeehouse owned by Edward Lloyd. It is now one of the world's most powerful commercial associations.

Loadstone, or Lodestone. See MAGNET.

Loam, *Lome.* See SOIL.

Loan and Trust Companies. See BANKS AND BANKING.

Lobe'lia, a name applied to a number of plants of the Lobelia Family, all of which are of value medicinally. They are coarse herbs or shrubs, growing in warm or temperate climes. There are many in the United States, growing in damp woodlands and easily distinguished by their straight stems, bitter, milky juice, wavy-margined, oval leaves and spikes of inconspicuous, but bright-colored, flowers. Most of the lobelias have a sickening odor, and from the leaves and tops a drug is procured, which is used as an emetic, cough remedy and preventive of spasms. The various lobelias are locally known as Indian tobacco, asthma weed, red-Betty, cardinal flower and bladder pot.

Lob'ster, a name given to a family of Crustaceans familiar everywhere through their use as food. The commonest-known species live in the sea and make their retreats in crevices of submerged rocks, from which only the heads and claws project. A living lobster is generally of dark color and attains its familiar brilliant hue only after being boiled. The body is made up of two divisions, the cephalothorax, or union of

head and thorax, and the abdomen. The cephalothorax bears the mouth and the appendages, one pair of which is greatly enlarged and so divided at its extremity that it forms a huge, crushing claw. Two pairs of appendages are antennæ, or feelers. The stiff, horny shell of the cephalothorax covers the folds of the gills and extends out in such a manner that the head and all the appendages may be retracted beneath it. The eyes, of which there is but one pair, are large and compound, and are so situated upon movable stalks that they give the lobster a wide range of vision. The abdomen is terminated by an incurved tail which may be straightened and curved to aid in swimming.

Lobsters are hatched from eggs, which are carried about by the mother on small, rudimentary appendages called swimmerets. For five or six months the immature lobsters swim about near the shore and then return to the sea. The shell of the lobster is not of living tissue and does not increase in size as the animal grows; hence it must be cast aside when too small to be protective. This process, known as ecdysis, occurs in some cases 14 or 15 times during the first year, three or four times during the fourth year and only rarely after that, although lobsters often attain an age of 15 or 20 years. The process is painful and consists of a slow splitting of the shell and a gradual slipping out from it by awkward contortions. For several weeks after, the lobster is in a fairly helpless condition until the new shell grows. Lobsters, like crabs, are able to renew any lost appendages, but frequently the new one is more rudimentary than its predecessor.

Lobsters are in constant demand as an article of food, and the lobster fisheries, which are confined to the Atlantic coast, rank fifth in value among the fisheries of the country. The largest reported lobster caught was nearly two feet long and weighed 34 pounds. See CRUSTACEA; SHRIMP. An authoritative work is Herrick's *The American Lobster*.

Lobworm. See LUGWORM.

Local Option, a political term meaning the right of local choice and applied only to the question of licensing or prohibiting the sale of intoxicating liquors. Many states have local option laws which allow a village, city, town or county to decide by popular vote whether or not intoxicating liquors shall be sold within their boundaries, and, if sold, under what restrictions, though these restrictions must conform to the state laws.

Lock, a mechanical contrivance for fastening doors, trunks, boxes and similar objects. The essential parts of a common lock are the bolt, the staple, into which the bolt is thrown, and the spring, which prevents the bolt from being thrown without the key. The bolt is usually provided with one or more pieces of steel attached to it by a pivot and containing notches. These are known as tumblers, and they prevent the lock from being operated by any key except that made especially for it. Projections on the keyhole, called guards, prevent any key, except the one fitted to the lock, from being inserted. The Yale lock, so named from its inventor, contains a series of pin tumblers, each of which prevents the bolt from being thrown. It is worked with a thin key about two inches long, with an irregular series of notches on each edge and one or more grooves on the sides. Each notch fits a tumbler, and it is almost impossible to work the lock with any key except that made especially for it. See SAFE.

Lock (Canal). See CANAL.

Locke, *Lock,* **John** (1632-1704), a distinguished English philosopher, born at Wrington, near Bristol. His father was an attorney and served in the Parliamentary army during the Civil War. Locke graduated at Oxford in 1656, and lectured there on Greek, rhetoric and moral philosophy from 1661 to 1664. Next year he went to Cleves as secretary to the British envoy; but soon returned to Oxford to study medicine, and in 1666 became physician in the family of Lord Ashley, afterwards Earl of Shaftesbury, under whose patronage he held various offices. He drew up a noted

constitution, known as the Grand Model, for the Carolinas, of which Shaftesbury was one of the proprietors; but it was never adopted because its terms were not fitted for a new country. He followed the Earl in his forced retirement to Holland in 1682, where he remained until 1688. In 1695 he became member of a new council of trade, with a salary of £1000.

In 1687, while in Holland, Locke finished his great *Essay Concerning Human Understanding*, on which he had been working for 17 years. It was published in London in 1690 and attained immediate celebrity. In this essay Locke is the founder of the realistic school of philosophy and the father of modern materialism. He deals wholly with the limits of human thinking and comes to two conclusions: first (negatively), there are no innate ideas; second (positively), all our knowledge originates in experience. At birth the mind is a blank (*tabula rasa*) upon which experience writes ideas. Experience itself is twofold: either it arises through the perception of external objects by means of the senses (sensation); or it is the perception of the activities of our own understanding (reflection). Sensation and reflection are thus the two windows through which alone the light of ideas falls upon the original void of the mind. This philosophy of Locke exercised great influence upon the development of English thought.

Lock'hart, John Gibson (1794-1854), a Scottish author, born in Lanarkshire. He contributed to *Blackwood's Magazine* several brilliant criticisms as well as translations of Spanish ballads. In 1820 he married the daughter of Sir Walter Scott. In 1825 he became editor of the *Quarterly Review*. His *Life of Walter Scott* is an admirable biography, ranking a close second to Boswell's *Johnson*. He also wrote a life of Burns and one of Napoleon, as well as a few novels which lack distinct merit.

Lock Haven, Pa., county seat of Clinton Co., 25 m. s. w. of Williamsport, on the West Branch of the Susquehanna River at the mouth of Bald Eagle Creek, on the Pennsylvania Canal and on the New York Central & Hudson River and the Pennsylvania railroads. Pine lumber is the chief export. The Central State Normal School is located here, and also a hospital and a fine courthouse. The industrial establishments include planing mills, tanneries, foundries, fire-brick and sewer-pipe works and manufactories of paper, cigars, furniture, silk and other articles. Lock Haven was settled in 1769. It was incorporated as a borough in 1844 and as a city in 1870. Population in 1920, U. S. census, 8,557.

Lockjaw. See TET'ANUS.

Lock'outs. See STRIKES AND LOCKOUTS.

Lockport, N. Y., county seat of Niagara Co., 26 m. n. e. of Buffalo, on the Erie Canal and on the New York Central & Hudson River and Erie railroads. The canal descends here about 60 ft. from the level of Lake Erie to the Genesee level by five locks of massive masonry, and passes through a channel cut in solid limestone several miles in extent. Lockport has important industrial establishments, which include iron foundries, machine shops, pumping-machinery works, and pulp, paper, rolling and fiber mills. Population in 1920, 21,308. See ERIE CANAL.

Loco-Focos, *Lo" ko-Fo' coze,* the radical faction of the Democratic Party in 1835, originating in New York, though the name was afterward national. While the Federalists were in control of the government their method of granting bank charters and controlling banks caused them to be charged by the opposing party with favoritism. When the Democrats gained control, things did not improve in the opinion of many, and a party was formed opposed to special bank legislation. At a meeting held in Tammany Hall, Oct. 29, 1835, the regular Democrats tried to gain control. Finding themselves unable to do so, they turned out the lights and retired. The other faction quickly produced candles and a kind of match called a loco-foco match, and the meeting continued; hence the name Loco-Foco. The new party

adopted the name Equal Rights in January, 1836.

Lo"como'tive, an engine mounted on wheels and capable of propelling itself. When used without qualification, the term means a railway engine. Locomotives are propelled by steam, by compressed air, by gas and by electricity. The essential parts of a steam locomotive are the boiler, the frame, the engine, and the wheels, upon which it is mounted. The boiler is horizontal, and in the largest locomotives is about 7½ ft. in diameter and about 45 ft. long. The fire box is at the rear end and a little below the boiler, and a large number of tubes extend through the boiler and greatly increase the heating surface. When filled with water, a boiler of this size weighs about 80 tons (See BOILER). The fire box necessary to supply a boiler of this size with heat must be at least 10 by 9 ft., and the heating surface must exceed 6225 sq. ft.

The boiler is mounted on the frame, which rests upon the wheels. Some parts of the engine, as the cylinders, are made a part of the boiler, while other parts are attached to the frame and the wheels. The locomotive is really a double engine having one engine on each side (See STEAM ENGINE). The wheels consist of drive wheels and trucks. The former are large wheels to which the power is applied. They vary in number according to the pattern of the locomotive and the purpose for which it is designed. The ordinary high-speed passenger locomotive has four or six drive wheels, usually about 6 ft. in diameter. These are joined by a bar so that power is applied to all equally and the maximum hauling power of the locomotive secured. In freight locomotives there may be eight or ten drive wheels. In the case of the latter number no trucks are required. The drive wheels on a freight locomotive are smaller than those on one designed for passenger service. Here speed is sacrificed for power.

The number of trucks depends upon the type of locomotive. The type with four or six drive wheels has four trucks in front. These are mounted in a frame, which is attached to the frame of the locomotive by a swivel. This pattern of truck is called a bogie, and it enables the locomotive to run on a curve as well as on a straight track. A locomotive with eight drivers usually has one pair of trucks in front, and those with ten drivers have none or one. The bicycle type, which has only one pair of drivers, has four trucks on a bogie in front and one pair of the drivers.

The frame to which the other parts of the locomotive are attached is made of cast iron and steel and is of great strength. At the rear end of the boiler is a cab for the engineer and fireman. In this are all the attachments for controlling the locomotive. These include the throttle, the reversing lever, the air-brake lever, the steam gauge and numerous other minor attachments. On top of the boiler are the steam dome, the sand dome, the whistle, the bell and the smokestack. Attached to the locomotive is a tender, which is a car for carrying the water and fuel. The tender is rectangular in form and mounted on two bogies. The tank usually surrounds the fuel box on three sides. The largest tanks hold about 12,000 gallons of water; the smaller ones, about 5000 gallons. The tender carries from 10 to 14 tons of coal. If crude petroleum is employed for fuel, it carries about 4000 gallons.

Nearly all modern locomotives are of the compound type; that is, they have four cylinders, two for high-pressure steam and two for low-pressure. These cylinders are located on each side of the locomotive, one above the other. The high-pressure cylinder, being the smaller, is above the low-pressure cylinder. This construction allows a larger percentage of the steam power to be used. A steam pressure of 200 lb. to the square inch can be maintained, and the tractive, or hauling, power of the locomotive is determined by multiplying the square of the diameter of the cylinder by the length of stroke, and this product by the pressure, and dividing the entire product by the diameter of the drive wheels. If the cylinder has a diameter of 16 inches, a

stroke of 20 inches, and the steam pressure is 200 lb. and the diameter of the drive wheels 72 inches, the tractive power would equal $\frac{16^2 \times 20 \times 200 \text{ lb.}}{72}$, or 14,222 lb., or about 7¼ tons. This, of course, is an estimate for a very small locomotive. The most powerful engines will haul a load of 7500 tons at a speed of 10 m. per hour on a level track. Passenger locomotives built for speed often average over 60 m. per hour, and where conditions are favorable they occasionally exceed 100 m. an hour for short distances. The heaviest locomotive ever constructed weighs 616,000 lb. and the next in weight is 540,000 lb. These engines have ten drive wheels on each side and are used as pushers on heavy grades in the mountains. In 1912 there were over 65,000 locomotives in the United States, and the manufacture and repair of locomotives is an industry of great importance. Aside from the manufactories connected directly with the great railroads, there are large locomotive works at Philadelphia, Paterson, N. J., and in other cities.

HISTORY. The early history of the locomotive is inseparable from that of the steam road wagon (See AUTOMOBILE, subhead *History*). The first successful railway locomotive was the *Rocket,* constructed by George Stephenson of England and placed on the Liverpool & Manchester Railway in 1829. The *Rocket* weighed over four tons and was able to travel from 16 to 20 m. an hour. The first locomotives used in the United States were brought from England. In 1830 Peter Cooper of New York built a small locomotive having an upright boiler. It weighed less than a ton but was successful. In 1832 Mathias Baldwin built *Old Iron Sides,* and this was the beginning of locomotive construction in the country. Mr. Baldwin founded the Baldwin Locomotive Works, which has become one of the largest establishments of its kind in the world. The modern locomotive has been developed from these early English and American types. See RAILROAD. Consult Reagan, *Locomotives: Simple, Compound and Electric.*

Locomotive, Electric, a locomotive in which electricity is used as the motive power. The electric locomotive is the development of the motor used on electric cars, and operates on the same principle (See ELECTRIC MOTOR; ELECTRIC RAILWAY). The electric locomotives used on steam railways are as powerful as the steam locomotives which they replace, and are employed in tunnels and, in New York and some other cities, to haul trains from the city limits to their terminals. Their use does away with the smoke and gases given off by the ordinary locomotive.

Lo"como'tor Atax'ia, a disease of the nervous system, marked by loss of muscular control. It is sometimes accompanied by partial paralysis. It is not the result of muscular weakness, but of lack of harmonious and proper action. The earlier symptoms are impaired vision, pains in the limbs and constitutional disturbances. The progress of the disease is slow. In the later stages the patient has great difficulty in walking; he moves with short halting steps and sometimes falls. The disease is incurable and usually lasts several years.

Loco Weed, a weed of the Pulse, or Pea, Family, common on Western plains and much feared because of its harmful effect upon cattle. The stems of all species are erect and have small leaflets arranged along a general leafstalk much like those of the common vetch. The flowers, which are tubular and may be white, purple or yellow in color, grow in clusters that vary in shape according to their species; the individual blossoms are small and produce a podlike fruit late in the summer. The plant renders insane the cattle that feed upon it, and stockmen watch carefully that it does not appear upon their pastures. The name loco weed is derived from the Scotch word *loco,* meaning mad.

Lo'cust, a tree or shrub of the Pulse, or Pea, Family, native in the Alleghenies but planted in parks and along streets throughout central United States. Generally it is a straight, broad-topped tree, whose chief beauties are its light green,

delicate leaves and fragrant white flowers. The leaves are made up of 12 to 15 oval leaflets, and the flowers, which are butterflylike and hang in long, drooping clusters, are attractive, rendering it one of the most popular ornamental trees in the United States. The fruit, like that of all members of this family, is a pod. The yellow locust has very rugged bark of light gray color; the clammy locust is smoother with longitudinal scars on its surface. Other common locusts are the water and the honey locust. See HONEY LOCUST.

Locust, the popular name of a family of Insecta known scientifically as the Acridiidæ. An unfortunate confusion has arisen in regard to terms, for the family scientifically known as the Locust is popularly known as the Grasshopper. Such interchange of terms is now too well grounded to be remedied, and is only avoided by the explanation as to

LOCUST

whether the term *locust* is used popularly or scientifically. For a discussion of the Locust Family, see GRASSHOPPER.

The locusts discussed here are those sometimes known as the short-horned grasshoppers because of their comparatively short antennæ, which are never more than one-half the length of the body and are made up of 25, or less, segments. A horny sheath covers the neck and thorax, and from it the head projects in a downward position, which brings the mouth parts upon the underside. The body is strong and thickened; the hind limbs are long and in many species extend backward rather than up, so that the knee joint does not lie above the line of the back. The forewings are narrow and act as covers for the thin, much-folded hind wings, which spread to an unexpected extent when the locust is in flight. The wings, however, are less commonly used than the hind limbs, for the locust is a leaping, rather than a flying, insect.

As with the grasshopper, the sound-making device, or stridulating organ, belongs only to the male. Some produce their "chirp" by rubbing the roughened hind legs against the stiffened wing covers; others chirp only during flight and do so by rubbing the upper surface of the hind wings against the lower surface of the forewings.

Locusts often appear in great swarms and do incalculable damage to growing crops, destroying whatever growing grains or young vegetation lies in their path. The increased cultivation of the land seems to have rendered the pest less common. Where they do become numerous, flocks of turkeys are of great assistance in keeping them down. Spraying crops with poisonous solutions (See INSECTICIDE) and plowing fields late in the fall to destroy the wintering eggs are effective means of destroying the insects. The so-called 17-year locust is really a cicada. See CICADA; ORTHOPTERA.

Lodge, Henry Cabot (1850-), an American author and statesman, born in Boston. He graduated from Harvard in 1871 and was admitted to the bar in 1876. From that date until 1879 he was lecturer on American history at Harvard, from 1873 to 1876 was editor of the *North American Review,* and of the *International Review* from 1879 to 1881. After serving in the State Legislature he entered the lower house of Congress in 1887, where he remained until 1893, when he became United States senator, being reelected in 1899, 1905 and 1911. He was a delegate to all the Republican National conventions from 1884 to 1912. He is recognized as an able writer as well as lawyer and legislator. His writings include *Studies in History, Hero Tales from American History, Short History of the English Colonies in America,* and biographies of Washington, Hamilton and Webster.

Lodz, the capital of the district of Lodz, in the Government of Piotrkow,

in Russian Poland. It is situated 87 m. by rail s. w. of Warsaw, on the Ludka River, and ranks next to that city in importance. The textile industry has developed rapidly since its establishment in 1815, and in addition to the production of cotton, silk and linen goods, machinery is also manufactured. The inhabitants are, in the main, Poles, Germans and Jews. Population, about 352,000.

Loeb, *Lobe,* **Jacques** (1859-), a German-American biologist, educated in Berlin, Munich and Strassburg. He became successively assistant professor of physiology at the University of Würzburg and at the University of Strassburg, associate professor of biology at Bryn Mawr College, professor at the University of Chicago, professor of physiology at the University of California and, in 1910, head of the department of experimental biology at the Rockefeller Institute for Medical Research in New York. Professor Loeb is especially famous for having shown the effect of salt solutions on the heart. His latest book is *Chemical Fertilization of the Animal Egg.*

Loess, *Lo' es,* a porous, loamy deposit occurring in abundance in the valleys of the Rhine, Danube and Rhône, and in the Mississippi Valley of the United States and in China. It is gray or brown in color, and in texture is a fine-grained sand, with an admixture of clay, but not enough to render it plastic. Small grains of quartz, fine scales of mica, some carbonate of lime and oxide of iron also are present. Loess imparts fertility to the soil, especially when containing remains of organic matter; but it requires considerable moisture on account of its porous nature. Theories differ as to the origin of loess. Its occurrence in river valleys is probably due to stream deposition, the sediment from melting ice during the glacial and postglacial periods having thus been brought down. However, where vast deposits occur, their origin has been attributed to glacial lakes, and again to action of the wind. The chief commercial value of loess is in the manufacture of bricks, which closely resemble the adobe used for building in the Southwest. See Adobe; Glacial Period; Soil.

Lofo'ten, or **Lofo'den,** a chain of islands extending about 175 m. off the northwestern coast of Norway. Their surface is generally rugged, and, on one, mountains rise to a height of 3000 ft. The inhabitants live along the coasts and support themselves by scanty agriculture and sheep raising, and by the cod fisheries which have been famous for centuries, now employing about 30,000 men. The fisheries are among the richest in the world and they have long constituted the chief national wealth. Population, 43,000.

Log, a device by which the rate of a ship's travel through the water is measured. The common log consists of a piece of thin board, forming the quadrant of a circle having a radius of about six inches, one end of which is weighted with lead so as to make it stand upright when thrown into the water. One end of a log line is fastened to the log, while the other is on a reel. When the log is heaved, or thrown overboard, at the stern of the vessel, the length of the line unwound in a given time forms the basis of a calculation for the rate of the ship's speed. Various mechanical devices are used instead of the common log, one being a triangular box towed astern, containing a spindle on which there are four wings attached spirally. The action of the water rotates these, and by means of a series of wheels, which move a hand on a dial, the distance traveled is recorded.

Lo'gan, John Alexander (1826-1886), an American soldier and statesman, born in Jackson County, Ill. After serving in the Mexican War, he entered and graduated from Louisville University. He then practiced law and served in the Illinois Legislature and in Congress until 1861, when he resigned to enter the army. He was at first a private in a Michigan regiment and participated at Bull Run, but he was soon made colonel in an Illinois regiment, and saw service at Belmont, Ft. Henry and Ft. Donelson. As major-general he commanded a division in the Vicksburg and Atlanta cam-

paigns of 1863-64, being conspicuous at Kenesaw Mountain and being twice in command of the Army of the Tennessee. From 1866 to 1871 he again sat in Congress, and he then succeeded Richard Yates as United States senator. After practicing law in Chicago for a short time, he returned to the Senate in 1879, and here was reelected in 1885, gaining a wide reputation as an aggressive and effective orator. Previously, in 1884, he had been Republican candidate for vice-president on the unsuccessful ticket headed by James G. Blaine. He wrote *The Great Conspiracy* and *The Volunteer Soldier of America.* Consult Dawson's *The Life and Services of John A. Logan.*

Logan, Utah, a city and the county seat of Cache Co., about 75 m. n. of Salt Lake City, on the Logan River and on the Oregon Short Line and other railroads. The city contains, among other industrial plants, flour mills, a brewery, knitting mills, lumber mills and manufactories of beet sugar and condensed milk. It is the seat of the Utah State Agricultural College, of Brigham Young College, and of the New Jersey Academy, controlled by the Presbyterian denomination. Logan was settled in 1859 and incorporated in 1866; and was until recently operated according to a general state act of 1898. It is now administered under the commission form of government. Population in 1920, 9,439.

Lo'gansport", Ind., a city and county seat of Cass Co., 75 m. n. w. of Indianapolis, on the Wabash River at the mouth of the Eel River, on two divisions of the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad, and on the Wabash, the Vandalia and other railroads. The Ft. Wayne & Wabash Valley and the Indiana Union Traction Company also operate interurban lines. Logansport is locally known as the "City of Bridges." Abundant water power and natural gas contribute to the industrial advantages. The city controls a large trade in lumber, grain and pork, and has manufactories of automobiles, motors, car trucks, hubs and spokes, flour, furnaces, water wheels, baskets, brooms and iron, brass and aluminum castings. The quarries near the city limits furnish large quantities of crushed limestone. Logansport contains a number of institutions, among them being Longcliff, the Northern Indiana Hospital for the Insane, Home for the Friendless, an orphanage and St. Joseph's Hospital. There are also a public library and fine Federal Building. The city was named after Captain Logan, a Shawnee chief, who was killed by the Indians in November, 1812. It was incorporated in 1831 and received a city charter in 1838. Population in 1920, U. S. census, 21,626.

Log'arithm of a number, the exponent of a fixed number, called the base, which indicates the power to which the base must be raised in order to produce the number. Thus since $8^2 = 64$, 2 is the logarithm of 64 to the base 8; 64 is then called the antilogarithm of 2. The value of logarithms in practical use depends upon the algebraic laws that in multiplying like terms the exponents are added; in dividing, they are subtracted. Thus since $8^2 = 64$ and $8^3 = 512$, $8^2 \times 8^3 = 8^5 = 32768$; expressed logarithmically this would be $\log_8 64 = 2$, $\log_8 512 = 3$, $\log_8 32768 = 5$; and would be read logarithm of 64 to the base 8 is 2, etc. By the use of lists of the logarithms of numbers, called logarithm tables, the mechanical operations of multiplication and division of large numbers are greatly simplified. A guide to the method of using the tables is generally given with them, but in practical use logarithms are of value chiefly to engineers or to those who have long mechanical operations to perform.

Logarithms were probably first computed by the mathematician Bürgi, who lived from 1552 to 1632. He, however, attached little importance to his invention, and John Napier of Scotland is regarded as the father of logarithmic computation. In 1814 he announced his invention, published his tables and showed the uses to which they could be put. In 1624 Briggs calculated a table of loga-

rithms upon the base 10, and this is the system in use at present and known as the common, or Briggs, logarithms. He found these by listing first the perfect powers of 10; as,

$10^1 = 10$
$10^2 = 100$
$10^3 = 1000$

and then introducing between these the geometric means of the numbers in the right-hand column and the arithmetic means of the exponents in the left-hand column. By continuing this operation and carrying it out sufficiently in decimals a great degree of accuracy was obtained. The modern method of computing the tables is by means of what has been termed the logarithmic series. Hutton's *Mathematical Tables and Mathematical Tracts* gives a complete account of the construction of the early tables.

Log Book, a book used on ships in which all records of the voyage are made daily. These include weather notes, ships hailed or seen and all events of the voyage. In almost all the navies of the world, the commanding officer has charge of the log book, and it is a strict rule to have all events recorded and signed daily. When the book is full, it is filed among the archives of the navy department as a record. See NAVY.

Logic, *Loj' ik,* (from Greek *logikos,* pertaining to speaking or reasoning), the branch of philosophy that deals with reasoning, or the science of correct thinking. There are three sciences which deal with thinking: (1) *psychology* treats the processes of thinking as *mental occurrences,* without reference to whether they are valid or invalid, true or false; (2) *epistemology* treats of the *validity* of the thinking processes, in connection with the whole question of the validity of knowledge; (3) *logic* deals with the problems of *correct* thinking and answers the question, What are the laws of valid reasoning? Reasoning may be of two kinds. It may be deductive, proceeding from the general to the particular. If we know that all birds are animals, and that robins are birds, we know that robins are animals. In such reasoning logic employs the deductive syllogism (See SYLLOGISM). Or, reasoning may be inductive, proceeding from the particular to the general. This is the method usually employed in science and in common life. If I observe that eagles, ducks, chickens, crows, blue jays and many other birds have wings, I come to the conclusion that all birds have wings. This is what we call *generalizing.* In such manner the hypotheses of science are formed. But such conclusions are not always correct. If I note that ducks, geese and swans swim, and conclude therefrom that all birds swim, I make a mistake. All general conclusions drawn from particulars, therefore, must be carefully tested and are never infallible. As a matter of fact our ordinary reasoning is partly deductive and partly inductive. Logic considers these laws of correct reasoning in detail.

FALLACY. By *fallacy* we mean a violation of the rules of reasoning. A common form of fallacy is arguing in a circle; that is, stating as a premise the fact to be reached as the conclusion. Another form consists of the use of a term in such a manner as to disguise or pervert its meaning, as the wrong use of emphasis or accent. See INDUCTIVE METHOD; DEDUCTIVE METHOD; ÆSTHETICS.

Log'wood", a Central American tree of the Cæsalpine Family. The bark and sapwood are of little commercial value, but the heartwood is used in the manufacture of a rich purple dye whose color, however, is not stable unless treated with a fixing solution called a mordant. The wood itself is crimson and for this reason the tree has the local names of heartwood and bloodwood. Logwood is also used in medicine and as an antiseptic. It is now quite extensively cultivated in the West Indies.

Lohengrin, *Lo' en grin,* the hero of medieval German legend of the knight of the swan. He was one of the knights of the Holy Grail and was sent by King Arthur from the Castle of the Grail to the help of Elsa, Princess of Brabant.

Lohengrin traveled on a boat drawn by a swan. Elsa's foe, Telramund, was vanquished at Mainz, and Lohengrin married her with the provision that she should never inquire his origin. She disobeyed him, and the swan returned, while Lohengrin departed. This legend was celebrated in Wolfram von Eschenbach's *Parzival,* and is also the basis of Wagner's opera, *Lohengrin,* first produced at Weimar, Aug. 28, 1850. Different versions of this story occur in French legend and literature.

Loire, *Lwar,* the longest river of France. It rises in the Cévennes in the Department of Ardèche, turns from a north and northwesterly direction to southwest and west, and empties into the Bay of Biscay at Saint-Nazaire. Its total length exceeds 620 m., of which 490 m. are navigable at certain periods of the year. At times the melting snows cause disastrous floods.

Loki, *Lo' ke,* (Lightning), in Northern mythology, giant deity of fire, was backbiter of the gods and originator of all deceit and mischief. Handsome, of fine physique and great ingenuity, he was the embodiment of seductive and seemingly innocent wickedness. When, however, he was compelled to exert his abilities for the good of the gods, the results were most helpful. Loki was emblematic of hearth fires, and when the logs snapped in the flames, Norsemen believed that the god was beating his children. On the introduction of Christianity, Loki, being "arch deceiver" and "prince of lies," was identified with Satan.

Lol'lards, the name first applied about 1300 to a society arising in Antwerp and Brabant, the members of which were engaged in the care of the sick and the burial of the dead. The name is more commonly known, however, as the designation of the followers of John Wiclif, in the 14th and 15th centuries. The Lollards in England condemned the use of images in the churches, pilgrimages to the tombs of the saints, the temporal lordship of the clergy, papal authority in administration, the mass, transubstantiation, war and the infliction of capital punishment. They were severely persecuted, especially during the reign of Henry V, but Lollardism continued until the time of the Reformation.

Lom'bard, Peter. See PETER LOMBARD.

Lombards, a Teutonic people living on the Lower Elbe at the beginning of the Christian Era. They settled the neighborhood of the Danube in the fifth century, and in the sixth century, under their ruler, King Alboin, they conquered the northern part of Italy. In the middle of the eighth century the Lombard Kingdom reached its highest prosperity, but was overthrown in 774 by Charlemagne, and the country became a part of his empire.

Lom'bardy, the historic name of that part of northern Italy including the provinces of Bergamo, Como, Mantua, Brescia, Sondrio, Pavia, Milan and Cremona. It is, in the main, a fertile plain, occupying an area of 9374 sq. m. The name was derived from the fact of the Lombard invasion in the sixth century. The Lombard Kingdom came to an end in 774 by the conquests of Charles the Great, King of the Franks. See ITALY.

Lo'mond, Loch, *Lok,* the largest lake in Scotland, situated in the counties of Dumbarton and Stirling. It is about 23 m. in length. The surrounding mountains and wooded hills and its pretty islets form a picturesque scene. It is near Loch Katrine and the Kossachs, and is visited by many tourists.

Lon'don, the capital of England and the British Empire and the largest city in the world. It is situated on both banks of the River Thames, about 50 m. above its estuary; the river is from 600 to 900 ft. wide and is spanned by 14 bridges (within the County of London), among which "London Bridge" is foremost in point of usage as a modern highway and in historical interest. Surrounding the city below the Thames are low marshes, from which the city is seen to rise in an undulating plain north of the river. North of the Thames the distinct division of the city is between East and West, "East

THE METROPOLIS OF THE WORLD

Population one and one-half times that of Greater New York.

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REGENT STREET, LONDON

Here are located some of the most fashionable shops.

End" being generally recognized as the very heart of the poor territory. The western part includes Westminster and parts of Chelsea, Kensington, Marylebone and Paddington, and here are seen all the characteristics of higher-class life —the finest private residences, public parks and palaces in the city. South of the Thames again everything speaks of poverty, and the grandeur and wealth of the districts to the northwest are wholly lacking. The fact that London is the outcome of the growing together of a large number of smaller cities accounts for the fact that the different parts of the huge world metropolis present such varied aspects—unlike the characteristics of the majority of large cities which grow around a center. On the whole, the city lacks beauty, for the streets are narrow and densely peopled, and in the making of its various parts the Anglo-Saxon love for the practical is everywhere apparent.

CLIMATE. The two disadvantages of London climate are the abundance of fog and mist, due to the neighboring seas, and the prevalence of smirchy smoke, arising as a result of the large quantities of bituminous coal consumed to meet both industrial and domestic needs. On the whole, the climate is favorable, and the aggravation of diseases of the respiratory organs by this fog and smoke has been unnecessarily emphasized.

STREETS, BRIDGES AND PARKS. The streets of London are generally narrow and congested and do not adequately meet the needs of the heavy street traffic. Among the streets which have become world-famous, due to historic or commercial associations, are Fleet Street (connected with the newspaper trade); Oxford (known as the principal business thoroughfare next to Regent Street, where some of the most fashionable shops of the city are located); Piccadilly; Paternoster Row (the headquarters of the book trade); the Haymarket (containing the principal theaters and hotels); Bond Street; Pall Mall (the center of club life); and the Thames Embankment, which, along the north side of the river, forms into some of the most beautiful promenades in the world.

The bridges crossing the Thames include London Bridge, which, with its rows of houses and chapel in the center, was completed in the 13th century, and the Suspension, or Tower, Bridge, one of the engineering and architectural triumphs of the age. Others are Southwark, Blackfriars, Waterloo, Westminster, Battersea, Vauxhall, Victoria and Albert.

There are four royal parks: St. James's, Green, Hyde Park and Kensington Gardens. The total area of the London parks is 2900 acres. Hyde Park presents the most brilliant and varied scene, with its thousands of people who flock to enjoy the beauty of its lake, its heavy clumps of shrubbery and its immense trees shading wide expanses of green. The gardens along the Thames Embankment are the frequent resort of crowds of children and pleasure seekers. The principal squares of the city are Trafalgar, Lincoln's Inn Fields (the largest square), Hanover, Portman, Berkeley and Cavendish.

BUILDINGS AND MONUMENTS. Brick is the building material most commonly in use for domestic purposes, and except in the fashionable West End, where quarries and factories are noticeably absent, the smoke-laden air has robbed the city of any bright colors and given it instead a somberness which in its very dullness and grayness lends an air of mystery and picturesqueness to the whole. The "Old City" is the financial center of London, and it is estimated that more than 1,000,000 people work within its narrow limits during the day and at night forsake it for the pleasanter suburbs on the outskirts, leaving there only the police, the caretakers and their families. The Tower is perhaps foremost among the buildings of London for historic interest, and the old prison is now used as an armory and arsenal, and as a place for guarding the crown jewels of the kingdom. Westminster Abbey is one of the finest examples of Gothic architecture in England; the old chapel re-

ceived its name from the city in which it was erected in the days before Westminster lost its identity by being merged with London (See WESTMINSTER ABBEY). The Houses of Parliament front the River Thames for 940 ft., and with their two miles of corridors and over 1000 rooms are among the largest Gothic edifices in the world. Features of interest connected with them are the Clock Tower (316 ft.), with the great hourbell "Big Ben," and, on the interior, the House of Peers, the House of Lords and Westminster Hall. Among the prominent palaces are St. James's, Buckingham Palace, Marlborough House, Kensington Palace and Whitehall.

The churches of London have one characteristic of distinction—the steeple; and the cause of this can be traced to the activity and enterprise of Sir Christopher Wren (See WREN, SIR CHRISTOPHER), who by sheer need of economy concentrated his attention upon that particular feature. Prominent among the churches are St. Paul's Cathedral, Bow Church (with one of Wren's most noteworthy steeples), St. Martin's-in-the-Fields, the Roman Catholic Westminster Cathedral and Lambeth Palace.

The Bank of London is one of the most characteristic secular buildings of the city. The supreme courts of the kingdom are now found in a building occupying nearly four acres at the junction of the Strand and Fleet Street. The palatial Sessions House now occupies the historic site of the Old Bailey and the Newgate Prison, both of which were demolished to make room for the spacious new edifice. There are four Inns of Court: the Inner Temple, Middle Temple, Lincoln's Inn and Gray's Inn. The club buildings of the city are highly ornamental and impressive in architecture and proportion. They include the Athenæum, whose members are principally artists and men of science and letters, the Garrick (patronized by lovers of the drama), the Army and Navy, Brook's, Whites, the Reform Club in Pall Mall and the Carlton, the great Tory club.

There are over 36 theaters, including Covent Garden, Drury Lane, the Strand, the Lyceum, the Savoy, the Adelphi, the Haymarket, the Princess and the Criterion. Among the large music halls are the Alhambra, the Empire and the South of London Palace of Amusements. There are numerous museums of world-wide importance, foremost of which is the British Museum, that vast edifice including within its walls the countless treasures of art and nature and attracting yearly thousands of visitors who come there to work out undisturbed their problems of research (See BRITISH MUSEUM). Others are the Imperial Institute, the Natural History Museum, the Royal Albert Hall of Arts and Sciences, the Royal College of Music, the anatomical, geographical, geological and anthropological museums. The most complete collection of living animals in the world is the property of the Zoological Society and is installed in Regent's Park. Famous collections of paintings and sculptures are found in the National Gallery in Trafalgar Square, the Royal Academy of Art and the Victoria and Albert Museum.

MARKETS. London is famous for its picturesque markets, the remarkable display at dawn constantly attracting numberless tourists. Retail stores are gradually taking their place, but the poorer classes still obtain almost all their supplies from street venders, whose cries have long been the source of much interest. The principal markets are Covent Garden (flowers and vegetables), Leadenhall (poultry and game), Billingsgate (fish) and Smithfield (meat).

EDUCATION. There are nearly 1000 common schools, with an attendance of over 500,000 pupils. In addition are middle-class schools and endowed schools, but London is not a great university center, as are Oxford and Cambridge. The University of London, formerly merely an examining body, contains numerous institutions of all kinds, at the head of which are King's College and University College. Excellent instruction in medical and surgical science

is afforded in the city and attracts students from all parts of the world. Due to the large book-publishing trade, its numerous newspapers, the abundant literary and scientific societies, London is unquestionably the great literary and scientific center of the empire.

Population. The population of Greater London is estimated at 7,010,172, thus comprising more than one-fifth of the total population of England and Wales. About three per cent represent the natives of the British colonies and those of foreign birth, while more than one-half of the total inhabitants were born in London.

Communication and Commerce. The scenes of the streets of London are unrivaled among the cities of the world, so far as the multitudes that throng its thoroughfares are concerned. It is estimated that over 20,000 vehicles and 100,000 foot passengers cross London Bridge daily, and streets like Cheapside and the Strand witness the influx of the largest numbers. The principal means of communication are passenger boats for crossing the Thames, four tunnels (Thames, Greenwich, Blackwall and the Tower Subway) under the river, over 240 m. of street railroads and a complete and efficient system of surface and underground railroads. Thousands of cabs, carriages and omnibuses carry a large per cent of the floating population. The foreign trade of London is rapidly approaching the billion and a half dollar mark. The exports are comparatively small, for London is preeminently a center for the consumption of food and other supplies. The city is also the distributing point for articles consumed throughout Great Britain, the center of the railroad system of the islands and the chief British market for colonial wares.

Industries. London is still the principal manufacturing city of the empire, although within recent years it has been surpassed by Leeds, Sheffield, Birmingham and other cities in specialized lines of production. The industrial establishments are grouped principally in the southeastern part of the city and on the Surrey side of the River Thames. The chief industries represented are the manufacture of machinery, furniture, clothes, the weaving of silk and printing. Since the introduction of iron and steel, London is no longer the great shipbuilding center, but now yields its position to those cities which are nearer the large iron and coal fields. The money interests of the world center in the metropolis, more specifically, in the Bank of London, the principal bank of deposit and circulation in Europe. This gives rise to a vast accumulation of capital, which in turn attracts the attention of investors who are constantly seeking favorable opportunities for floating enterprises here or in almost any other part of the world.

Government. The British Government exercises central control of the affairs of London, while the duties and powers of local authorities are defined by Parliament. Among the boards with special functions are the Board of Education, of Trade, the Metropolitan Asylums Board, the Local Government Board, etc. The city has a debt of over $230,000,000 and the annual cost of the government far exceeds $85,000,000.

History. The history of the city dates back farther than the landing of the Romans, for upon their entry they found a town of fairly large size, near which they established their first colony. With the arrival of the Normans the Tower was begun by William the Conqueror as an effective citadel commanding the city, and many improvements were effected During the Middle Ages, wars, epidemics and financial crises checked rapid progress and growth in the city, and it was not until the 16th century that marked advancement in commerce and trade became apparent. The plague of 1665 and the fire the following year wrought great havoc and effected serious disasters, but permanent gain was made for the rebuilt city in wider streets and more open spaces everywhere. Since the beginning of the 18th century the progress and development has witnessed

a steady forward growth, and, through the Oriental commerce which the country's permanent footing in India secured, London has steadily grown until it has become what it is now—the metropolis of the world.

London, a city of Canada in the Province of Ontario, county seat of Middlesex County, 121 m. s.w. of Toronto, midway between Niagara Falls and Windsor, at the junction of the North and South branches of the River Thames, and on the Canadian Pacific, the Michigan Central, the Pere Marquette and the Grand Trunk Railroads. The London & Port Stanley, a municipally-owned road, connects London with Lake Erie, 23 m. to the south. London is the chief railroad center of western Ontario, and it is said that more trains enter and leave the city during the 24 hours than any other city in Canada. The city itself, as well as many of the streets and localities, is named from London, England. The handsome parks and broad, well-shaded streets have given London the name of the "Forest City." It is situated in the midst of a rich agricultural region and is an important distributing center, the wholesale houses being represented all over the province. The city contains large stove works, foundries, machine shops, flour and rolling mills and manufactories of agricultural implements, boots and shoes, caskets, clothing, carriages, chewing gum, cigars, brick, tile and cement. All the chartered Canadian banks have branches here. Among the educational institutions are Western University, Sacred Heart Academy and Huron College. The benevolent and charitable institutions include the provincial asylum for the insane, several hospitals and homes. London is the seat of a Catholic see and of an Anglican diocese. There are a large number of churches, including two cathedrals. Population in 1911, 46,000.

London, Jack (1876-1917), an American novelist, born in San Francisco, Cal. He studied at the University of California, but departed to the Klondike before completing his course of study and never returned to take his degree. In 1892 he went to sea, traveled through Japan, engaged in seal hunting in the Bering Sea and later tramped on foot through Canada and the United States, gaining material for articles and lectures on socialism. He began to write tales of adventure in 1894 and has since published a great number of books and contributed freely to magazines and other periodicals. His works include *The Son of the Wolf, The God of His Fathers, A Daughter of the Snows, The Children of the Frost, The Cruise of the Dazzler, The People of the Abyss, The Call of the Wild, The Faith of Men, The Sea Wolf, The Game, Tales of the Fish Patrol, Before Adam, Love of Life, When God Laughs* and *The Cruise of the Snark.*

London Company, one branch of a company organized in London in 1606 for the purpose of founding two colonies in America. This division of the company, known also as the Virginia Company, was to have jurisdiction over the territory lying between 34° and 41° north latitude, with 100 m. of seacoast, including all islands 100 m. to the eastward and all territory 100 m. to the west. It was to have a resident council of 13 members, subordinate to the superintending Council of Virginia and subject to the pleasure of the Crown. The first charter, granted by King James in April, 1606, was followed by a new charter in 1609, giving the company the privileges of a corporation. The first expedition of the company founded the Jamestown Colony in Virginia.

Long Beach, Cal., a city and summer resort of Los Angeles Co., 22 m. s. of Los Angeles, on the Pacific coast several miles east of San Pedro, and on the Southern Pacific and other railroads. A number of electric lines reach the city from Los Angeles, Pasadena and adjoining towns and cities. Long Beach has one of the finest stretches of level beach on the coast. There is a pleasure pier, 1600 ft. in length, with an auditorium at the outer end seating 4000 people, and fine hotels and cottages. Dur-

ing the past few years the growth of Long Beach has been rapid, a protected harbor having been dredged within the city limits where the Los Angeles River empties into the sea. Long Beach, hitherto known chiefly as a pleasure resort, is becoming an important manufacturing and shipping center. Population in 1920, U. S. census, 55,593.

Long Branch, N. J., a city and popular summer resort of Monmouth Co., 32 m. s. of New York City, about 70 m. n.e. of Philadelphia and 7 m. from Asbury Park, on the Atlantic Ocean and on the Pennsylvania, the Central of New Jersey and the New Jersey Southern railroads. During the summer several palatial lines of steamers run between New York City and the various Atlantic coast resorts, including Long Branch. The city is situated on a bluff overlooking the sea and has wide avenues and many fine hotels and residences. Ocean Avenue, five miles long, connects with Elberon, also an attractive resort. Long Branch is one of the oldest resorts in the United States and settlements were made as early as 1670. It derives its name from the "long branch" of the Shrewsbury River, and the long beach affords excellent bathing facilities. Prior to its occupancy by summer guests, which now number thousands, it was frequented by fishermen and wreckers. It has many churches and a fine library. The Star of the Sea Academy and the Monmouth Memorial Hospital are located here. Population in 1920, 13,521.

Longfellow, Henry Wadsworth (1807-1882), an eminent American poet, born at Portland, Me., February 27, the second of a family of eight children. The Longfellows, from the first of that name who immigrated to America (1676) down to the poet's father, Stephen Longfellow, had borne an honorable reputation, while his mother, Zilpah Wadsworth, was of the race of John and Priscilla Alden. The early influences that helped to shape the boy's character were of the best. Brought up by refined and cultured parents in a town that stood for simplicity and purity of life, Longfellow as a child was led to cultivate those virtues that so beautified his life in after years.

Boyhood in Portland. The first school Longfellow attended was in charge of a "Ma'am" Fellows, an austere lady who believed that the schoolroom was no place for smiling. Later he was sent to a private school, and, finally, to the Portland Academy, where he was prepared for college. Longfellow's literary tastes were early manifest. When Irving's *Sketch Book* appeared in 1819, it became at once his favorite book, and continued to charm him all his life. He began to write verses when he was only 13, some of which were published in a local paper of Portland, and his progress as a student is indicated by his entrance into Bowdoin College, Brunswick, as a sophomore, at the age of 15, to become one of the memorable class of 1825. Among his classmates were Hawthorne, the historian John S. C. Abbott and several others who afterward attained distinction in law and politics.

Student and Teacher in Brunswick. Longfellow's college career, though not eventful, served as a preparation for more important work to come later. A sentence from one of his letters indicates the seriousness with which he regarded this period of his life: "Whatever I study I ought to be engaged in with all my soul, for I will be eminent in something." His devotion to his studies did not, however, prevent his writing poetry, and many of the poems written while he was in college appeared in various periodicals. At this period he was greatly influenced by the poet Bryant, who began a literary career in New York in the year that Longfellow graduated.

Although his father hoped that he would study law, Longfellow left college with a burning desire to exercise his literary talents. Most happily for the poet and indicative of the honorable record he had gained in college, a professorship of modern languages was offered him by the trustees of Bowdoin, with the proposal that he complete his preparation for this work by travel and study in Europe.

A position so entirely in accordance with his tastes was accepted joyfully, and Longfellow sailed for Europe in the spring of 1826, where he remained for three years, assuming his duties at Bowdoin in 1829. The happiest event of this period of teaching was his marriage in 1831 to Miss Mary Potter. About the same time he began a series of travel sketches that were later published, with some others, under the name of *Outre-Mer*.

Professor in Cambridge. In 1834 Longfellow was tendered the Smith professorship of modern languages at Harvard, and in the spring of the following year he made a second journey to Europe, in company with his wife, for the purpose of further language study. The death of Mrs. Longfellow at Rotterdam, in November, was a sad blow, but he continued his study and travel, returning home in October, 1836, and entering upon the duties of his Harvard professorship in December of the same year. This position he retained for 18 years.

The town of Cambridge, in which Longfellow was to make his home the rest of his life, was then the literary center of New England, and the poet soon became associated with a noteworthy group of scholars and writers. He engaged a room in the fine old colonial mansion, known as the Craigie House, which later became his home, and here he began the work in literature that was to be the foundation of his fame. *The Reaper and the Flowers* appeared in 1837; the next year the *Knickerbocker Magazine* published *A Psalm of Life*, which became popular at once. *Hyperion*, a romance based upon his own experience, was published in 1839, closely followed by the first collected volume of his poems, *Voices of the Night*. In 1841 a second volume appeared, containing *The Wreck of the Hesperus, The Village Blacksmith* and other well-known poems. A third trip to Europe in 1842 brought him new inspiration and repaired his health, severely taxed by his busy life in Cambridge. On the journey home he wrote *Poems on Slavery*.

In June, 1843, Longfellow married the beautiful daughter of the Hon. Nathan Appleton of Boston, who purchased the Craigie mansion and the pleasant fields about it, presenting it to his daughter as a home for herself and husband. Two sons and three daughters, the Alice, Edith and Allegra of *The Children's Hour*, blessed a union that was unusually happy. Longfellow continued his work at Harvard until 1854, when he resigned in order to devote his time more fully to literature; but during those busy years he wrote his most ambitious poem, *Evangeline* (1847), and *Kavanagh* (1849), *The Building of the Ship* (1851) and *The Golden Legend* (1851). The next few years, which produced *Hiawatha* (1855) and *The Courtship of Miles Standish* (1858) mark the close of the brightest and most successful period of the great poet's life.

Later Years. In 1861 the sudden and tragic death of his wife came upon Longfellow with crushing force, and although his strength of character and serene religious faith enabled him to rise above his sorrow, its shadow was never wholly lifted. He found comfort in working on a translation of the *Divine Comedy*, and gradually resumed the tranquil course of his life in the home that was always a place of bountiful hospitality. To this later period belong *Tales of a Wayside Inn, Paul Revere's Ride, The Children's Hour* and *Ultima Thule*. In 1868 he made his last journey to Europe, where he was received with every mark of respect and admiration. Among those who generously welcomed him was Queen Victoria. On his 72nd birthday, this well-beloved "Children's Poet" was presented with a chair made from the wood of the famous chestnut tree mentioned in *The Village Blacksmith*, by the children of Cambridge, to whom he responded with the beautiful poem *From My Arm Chair*.

To the end of his life Longfellow kept his sunny, genial nature, but physical pain and loneliness were the portion of his last years. He died on the 24th of March, 1882. Among those who were

present at the simple funeral services were Emerson, Holmes, George William Curtis and President Eliot of Harvard. Shortly after his death his children presented the Longfellow Memorial Association with the meadow in front of the old home, so that the pleasant outlook over the Charles River, from Craigie House, will always remain as Longfellow loved to view it from his study.

Literary Qualities. That Longfellow, the most scholarly of our American poets, appealed especially to the people, not to scholars, is a tribute to the simplicity and kindliness of his nature. In this regard he is the opposite of that eccentric American, Walt Whitman, who, admittedly a poet of the masses, is appreciated by a very limited circle. In respect to their circle of readers, Longfellow is more nearly akin to Whittier, though Whittier was not a traveler, he spoke only his native tongue, he had no college training and he led the simple life of a recluse. The poetry that brings comfort and inspiration to those who love it in its simple forms, both Longfellow and Whittier wrote, because both were genuinely unselfish, sympathetic, unafraid to express what they felt.

Longfellow's poetry is characterized neither by originality nor profound analysis. He accepted life as he found it, not seeking for hidden truths or a new philosophy. His subjects are mainly the familiar incidents and experiences of life, aspects of nature as related to human feeling, and heroic deeds recounted in legend and history. His travel abroad and extended knowledge of the older literatures suggested many of his poems, his translations and his romances. All of his work displays unerring taste, clearness of language and delicacy of rhythm, while in such a poem as *Hymn to the Night* he shows himself capable of stirring and majestic effects.

In the consideration of Longfellow's services to American letters, his scholarship is sometimes overlooked. He was the first American to recognize fully the romantic beauty of the Old World literatures, and it was a part of his mission to awaken his own country to a sense of this beauty. That the Old World appreciated his position in literature is attested by the erection, in 1884, of a memorial bust in the Poets' Corner of Westminster Abbey. Yet the greatest poem that Longfellow created was his own life, which was a harmonious blending of all the ideals and aspirations his poems had voiced, a life that will always be a source of inspiration.

His heart was pure, his purpose high,
  His thought serene, his patience vast:
He put all strifes of passion by,
  And lived to God from first to last.

His song was like the pine-tree's sigh
  At midnight o'er a poet's grave,
Or like the sea-bird's distant cry,
  Borne far across the twilight wave.

There is no flower of meek delight,
  There is no star of heavenly pride,
That shines not sweeter and more bright
  Because he lived, loved, sang, and died.

—*William Winter.*

Long Island, an island in the Atlantic forming the southeastern extremity of New York. It is separated from the mainland on the north by Long Island Sound, and on the west by the East River and New York Bay. A number of suspension bridges span East River and connect the island with the mainland. Long Island is about 120 m. long and varies in width from 12 to 23 m. Its area is 1682 sq. m. The west end is densely populated, being occupied by the borough of Brooklyn, which is a part of Greater New York. It contains many railways and electric lines and noted summer resorts. Truck gardening is carried on, and many vegetables are raised for the New York market.

Long Island, Battle of, a battle of the Revolutionary War, fought on Brooklyn Heights, Aug. 27, 1776. Israel Putnam with 8000 Americans, half the entire army, was attacked by 15,000 British under General Howe, who advanced along four different roads, assailing the Americans on all sides. After several hours of brave fighting, Howe decided to besiege the position; but Washington determined to withdraw. In

doing so, he performed one of the most brilliant military exploits of the war. In the morning Howe was chagrined to find that his prize had escaped.

Long Island Sound, an arm of the Atlantic, separating Long Island from the states of New York and Connecticut. It is 110 m. long and from 20 to 25 m. wide. The strait called East River connects it with New York Bay; here was formerly found the narrow passage known as Hell Gate (See HELL GATE). It receives the Connecticut, Thames, Housatonic and Mystic rivers. The Long Island shore is easy of approach, and it contains several good harbors.

Longitude, *Lon' ji tude,* the angular distance east or west of any given meridian, called the prime, or first, meridian. A prime meridian is any meridian from which one may choose to reckon longitude, meridian meaning midday, or the line from pole to pole, at every point of which noon occurs simultaneously. Most English-speaking peoples and all mariners reckon from Greenwich; many countries reckon from their capitals. As the earth is a spherical body, measurements upon its surface are obtained by circular measurement. Latitude and longitude are so measured and are, therefore, expressed in degrees, minutes and seconds. The meridians or circles of longitude are widest apart at the equator and converge at the poles, being nowhere parallel; while the circles of latitude are at all points equidistant. A degree of longitude at the equator is 69.2 m. The distance between the meridians gradually diminishes with distance from the equator until at the poles there is no longitude. The greatest longitude a place can have is 180°, or halfway round the globe. (The greatest possible latitude is 90°, or one-fourth of a meridian circle, from equator to pole.) Longitude is used in dividing time. The length of time which it takes for the sun to cross one degree of longitude is four minutes; 15°, one hour; 360°, or the entire circuit, 24 hours. See LATITUDE; TIME, STANDARD; INTERNATIONAL DATE LINE.

Long Parliament, the name given to the last Parliament of Charles I of England. It began its session Nov. 3, 1640, and dissolved March 16, 1660. During the first few months the Star Chamber and other special courts were abolished, and a bill was passed preventing the dissolution of Parliament except by its own consent. The Irish rebelled in 1641, and a quarrel arose between the King and Parliament in regard to the control of the army sent to suppress the rebellion; this quarrel became the occasion for war with Charles. The Cavaliers, or King's men, left Parliament on the outbreak of the Civil War. The army was dissatisfied by concessions made to Charles by the Treaty of Newport (1648), and it expelled about 96 Presbyterian members. The 50 or 60 members left composed what is known as the "Rump Parliament," which executed Charles I and established the Commonwealth. It was in 1653 driven out by Cromwell and recalled after his death. The expelled members were reinstated, 1660. The Parliament then issued writs for a new election and dissolved itself March 16, of that year. See CHARLES I; CROMWELL, OLIVER.

Long'spur", a bird of the Finch Family, easily known by the extreme length of the nail of the hind toe. Excepting during the nesting season, these birds wander over the prairies and plains in immense flocks, feeding on seeds, grain and insects. The Lapland longspur is a little larger than the English sparrow. The neck and breast are black; the under parts, white; the back of the neck is crossed with bright chestnut; the upper parts are streaked with black, buff and white; the wings are blackish, with brown and white edgings; and the tail is dark brown. The nest is placed on the ground and is made of grass, lined with feathers. It contains three to six brown-speckled eggs. Smith's longspur may be distinguished from the Lapland by the brownish-buff under parts. These birds breed in the Far North, migrating in the winter to Texas, Kansas and Arizona.

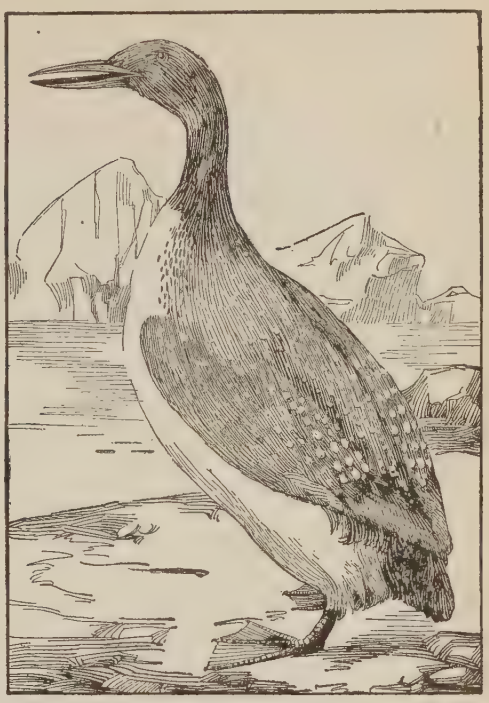
Long'street, James (1821-1904), an American soldier, born in South Carolina and educated at West Point. During the war with Mexico he was severely wounded and was brevetted captain and major for bravery. At the outbreak of the Civil War he entered the Confederate service, participating in the Seven Days' Battle, in the second Battle of Bull Run, where his timely arrival resulted in a Confederate victory; at Fredericksburg, Gettysburg, Chickamauga and in the Battles of the Wilderness. Throughout the struggle he was one of the ablest of Confederate leaders, and as Lee's "right-hand" man he rose to the rank of lieutenant-general. After the war he became a Republican. In 1880 he was appointed minister to Turkey, and from 1898 until his death he was United States commissioner of railroads.

Lookout Mountain, Battle of, a battle fought Nov. 24, 1863 resulting in a victory for the Union forces commanded by General Hooker over a force of Confederates strongly posted on the mountain. This was one of the engagements in the operations about Chattanooga, and, with the famous charge of Missionary Ridge, raised the siege of the city, forcing the retreat of the Confederate troops into Virginia. The Battle of Lookout Mountain is known as the "Battle Above the Clouds." See CHATTANOOGA, BATTLE OF.

Loom. See WEAVING, subhead *Loom.*

Loon, a bird of the Loon Family, also known as the great northern diver. It is about three feet long. The male is easily recognized by its velvety-black head and neck, which is somewhat greenish in certain lights; its white-streaked throat and white sides of the neck; its white breast; and its black, white-spotted back. It has a long bill, short legs and webbed feet. The nest is made in a lake and is frequently built on top of an old muskrat house. It contains two brown-spotted eggs. The young loons are downy and are able to care for themselves as soon as hatched. Loons are practically helpless on land, being unable either to run or fly. The water is their home, and they are the most expert swimmers and divers. The loon is famous for its loud, piercing cry, which to the timid sounds like the laugh of a demon.

LOON'S FOOT



GREAT NORTHERN DIVER

Loose Constructionists. See POLITICAL PARTIES IN THE UNITED STATES.

Lope de Vega, *Lo' pa da Va' gah.* See VEGA CARPIO, FELIX LOPE DE.

Lo'quat, a fruit-bearing tropical tree of the Rose Family, raised chiefly in Japan and southern China. Because of its fruit it has recently been introduced into California, where it is successfully grown. The tree is evergreen and, in cultivated species, is pruned to keep its height about 12 ft. The fruit is much like that of the pear, in shape, color and flavor, and is used for preserves and confections. The flowers of the loquat are large and white.

Lorain', Ohio, a city of Lorain Co., 27 m. w. of Cleveland, on the south shore of Lake Erie at the mouth of the Black River, which is navigable for large lake vessels for a distance of 4 m., and on the Baltimore & Ohio, the Lake Erie & Pittsburgh, the New York, Chicago & St. Louis, the Wabash and the Lorain & Ashland railroads. The city has 8 m. of harbor front and is an important port for several steamboat lines on the Great Lakes. It has a government breakwater and life-saving station. Lorain is a shipping port for the output of the central Ohio coal fields and for lumber, grain and iron ore of a large section of the state. Interurban and street-railway lines connect in all directions with the near-by towns and cities. The park system comprises nine public parks with an area of 218 acres. The public buildings include a city hall, post office, Y. M. C. A. Building, good business houses, a number of fine banks, and about 37 churches.

The educational institutions include a fine system of public schools, many private and parochial schools and a free public library. Among the charitable institutions are St. Joseph's Hospital and the Social Settlement House. Lorain has extensive shipbuilding yards, vast steelworks, automatic-shovel works, stove works, gas-engine works and railroad shops. There is also efficient dock machinery for handling large cargoes of iron ore, lumber and coal. A trading post was established here in 1807, and the first permanent settlement was made in 1822. The place was incorporated as a village in 1836 under the name of Charleston. The present name was adopted in 1874 and a city charter granted in 1896. Population in 1920, U. S. census, 37,295.

Lorenz, *Lo' rents,* **Adolf** (1854-), an Austrian surgeon. After his graduation from the University of Vienna in 1880, he became assistant to the professor of surgery in that institution. Advised to take up the prevention of deformities, he experimented many years before developing the fact that, by manipulation alone, he could reduce the dislocation of the hip joint. He demonstrated his method at a medical congress in Berlin in 1895, and became famous. In 1902 he visited the United States and England, demonstrating in both countries. Another of his operations straightens clubfoot. He has invented several instruments and is the author of various publications.

Lor'imer, George Horace (1868-), an American editor and author, born in Louisville, Ky., and educated at Colby and at Yale. He originally engaged in business, later entering newspaper work and in 1899 becoming editor of *The Saturday Evening Post.* Since then he has written *Letters from a Self-Made Merchant to His Son, Old Gorgon Graham, The False Gods* and *Jack Spurlock—Prodigal.*

Loris. A species of lemur. See LEMUR.

Los Angeles, *Lose An' gel es,* **Cal.,** a city and county seat of Los Angeles Co., on the Los Angeles River 20 m. from its mouth, 484 m. s.e. of San Francisco and 781 m. s.w. of Salt Lake City, on the Southern Pacific, the Atchison, Topeka & Santa Fe, the San Pedro, Los Angeles & Salt Lake railroad systems and their branches. The city is located immediately south of the Sierra Madre range of mountains and 15 m. e. of the Pacific Ocean. Los Angeles is an important seaport. By annexation San Pedro and Wilmington are within the city limits, the San Pedro Harbor becoming the harbor of the city. The expenditure of about $3,000,000 by the Federal Government on the breakwater and the dredging of the inner channels gave the city one of the finest harbors in the world. The area of the harbor is 575 acres and the breakwater is 11,000 ft. in length. Steamship lines are in operation from Los Angeles to San Francisco, Portland and Seattle, and to the Hawaiian Islands, China and Mexico. The opening of the Panama Canal will greatly extend the commerce not only of Los Angeles but of all the cities of the western coast. Los Angeles is known as

LOS ANGELES

the metropolis of the Southwest. The area of the city is over 350 sq. m. and the average elevation is 270 ft. The southern and southwestern portions of the city are level. Across the river are Boyle Heights, East Los Angeles, Highland Park and Garvanza. The street-railway system is very complete. There are suburban lines to Santa Monica, Redondo, Long Beach, Newport, Huntington Beach, Pasadena, San Pedro, Alhambra, Santa Ana and many other towns and cities. The suburban electric lines radiating from the city aggregate about 1000 m. of track. Inclined railways ascend Court Street and Third Street hills in the heart of the city. The city has important horticultural, fruit-shipping and petroleum interests, and the area of land within the county devoted to horticultural purposes is rapidly extending. Los Angeles has acquired valuable water rights extending along the banks of the Owen River in Inyo County. This water will be brought to the city, a distance of 240 m., by means of an aqueduct and 20 m. of tunnels. The cost of the enterprise is estimated at $25,000,000. All of the water in excess of the needs of the city may be used for irrigation.

Streets, Parks and Boulevards. Los Angeles has 25 public parks within the city limits, aggregating over 4100 acres. In the park system are Westlake, Lincoln, Prospect, Central, Hollenbeck, Echo, Sunset, South, Elysian, Griffith and Exposition parks. There are also eleven playgrounds, excellent golf links and nine vacation or summer centers. The thousands of beautiful homes are among the chief attractions of the city. The mildness of the climate permits plants and flowers to flourish in the open air throughout the winter. The streets are shaded with many varieties of trees, which include the graceful pepper, palm, eucalyptus, orange, acacia, grevillea and camphor.

Public Buildings. Among the noteworthy public buildings are the Federal Building, courthouse, city hall, County Hall of Records, a public library, Exposition Building, Chamber of Commerce with an exhibit hall, Art Museum, Auditorium, California, Concordia and Union League buildings, Blanchard Art Building, Y. M. C. A. and Y. W. C. A. buildings, about 40 banks, scores of fine business blocks, many elegantly-equipped hotels, which include the Lankershim, Alexandria and Van Nuys, 16 theaters and about 225 churches of all denominations, including Old Mission cathedrals as well as those of handsome modern architecture.

Institutions. Los Angeles is a college and university center. The University of Southern California (Methodist) is heavily endowed and finely equipped. Occidental College (Presbyterian) is a popular institution of higher education. Other institutions include the McClay College of Theology, Loyola College (Catholic), a state normal school, military academies for boys, collegiate schools for girls, business colleges and many private schools. The Polytechnic High School, built of white granite and marble, occupies a block at the head of Hope Street. The city contains over 200 school buildings. The benevolent and charitable institutions include a number of hospitals, orphanages and homes for the aged and friendless. The Soldiers Home is located at Sawtelle, an attractive suburb of the city.

Industries. The wealth and general prosperity of Los Angeles are founded largely upon the abundant natural resources. The horticultural products include everything that can be raised in semitropic countries. The choicest fruit land is largely devoted to the raising of oranges, lemons, grapefruit, peaches, prunes, grapes, olives and a great variety of small fruits. A number of the land sections are all-round farming regions, producing large quantities of pork, butter, cheese, corn and vegetables. The canning and preserving of fruits and vegetables are important industries. Flowers, bulbs and seeds are shipped East in large quantities. Ostrich raising, slaughtering and meat packing, lumber manufacturing and planing, wine and brandy

making, and flour and grist milling are also profitable industries. Rich oil-producing sections are in the western section of Los Angeles City, at Sherman, Puente, Whittier, Fullerton and Newhall, and in Kern, Ventura, Santa Barbara and San Luis Obispo counties, with an estimated yield of about 85,000,000 barrels annually. The refineries also handle an immense amount of crude products in the manufacture of lubricants, asphalt, coke and distillates.

History. The first settlement was made in 1781 by a number of colonists who had been recruited in the Mexican states of Sonora and Sinaloa under protection of the Spanish governor. The pueblo, or town, was named by this band *Nuestra Señora la Reina de los Angeles*—Our Lady, the Queen of the Angels. The first census of the little city in 1790 gave the population as 141. The census of 1880 gave the city a population of 11,311. Five years later, the last spike was driven in the Atlantic and Pacific Railroad. From that time the growth of the city has been rapid. Los Angeles is cosmopolitan, every state in the Union and almost every country in the world being represented. Population in 1920, U. S. census, 575,480.

Los'sing, Benson John (1813-1891), an American historian, born in Beekman, N. Y. In early life he was a watchmaker in Poughkeepsie, N. Y.; but when he was 22 years of age he became part owner and editor of the Poughkeepsie *Telegraph*. Later he went to New York City, where he edited the *Family Magazine*. Lossing began publishing books in 1841. At first he published illustrated works of a popular nature; but the historical studies involved in his work led him to further investigation in that line, resulting in his historical writings. Among his works may be mentioned *Pictorial Field Book of the Revolution, The Hudson from the Wilderness to the Sea, Pictorial Field Book of the Civil War, Pictorial Field Book of the War of 1812, History of New York City*, a series of histories for the public schools and a large United States history.

Lo'tus, or **Nelum'bo,** a plant of the Water Lily Family, closely resembling the water lily in habit of growth; it has long, slender stems and leaves, which rise from creeping rootstocks buried in lake or river bed, and spread flat upon the surface of the water. The buds are long and pointed and are concealed by three dark green sepals, which slowly open, disclosing many petals and stamens and a thick, fleshy pistil. The flowers differ in color according to the variety of the plant; the sacred lotus was probably yellow, the lotus of the Nile is blue, others

LOTUS

are white with yellow centers. Historically, the lotus is of especial interest since its spreading petals are responsible for many of the designs of Egyptian art. Its golden-yellow color made it a symbol for the sun worshipers and elsewhere in legend it is said to be the attribute of silence, the cradle of Moses, the throne of Buddha and the type of the creation. It is still used in Buddhist ceremonials and Japanese feasts, and is the national flower of both Egypt and India. In the United States there are many lotus beds which attract great interest. Chief among them are those of New York City, Monroe, Mich., and Grass Lake, Ill.

Other plants, such as the yellow pond lily, the bird's-foot trefoil and a tree of the Nettle Family, are also called lotus. From the latter plant a wine is said to have been prepared which rendered the one who quaffed it dreamily content and forgetful of home ties; such people were called the lotus-eaters, or the lotophagi.

Lotze, *Lote' se,* **Rudolf Hermann** (1817-1881), a German philosopher, born at Bautzen in Saxony. He studied philosophy and medicine at Leipsic, and in 1842 became professor of philosophy in that university. Two years later he succeeded Herbart in the professorship at Göttingen. Here he remained for 37 years and did practically all of his work. Lotze's philosophy attempts to reconcile mechanism and teleology; that is, to show that a scientific explanation of things does not exclude the idea of purpose. Indeed the opposite is true. The fact that things are not independent, but are essentially related, is proof of purpose in the world. Lotze's teleological idealism is ethical rather than intellectual. He is influenced by the demands of his feelings quite as much as by the requirements of logic. The universe has its cause in the Good, which underlies all the phenomena and activities of the world. Lotze was one of the most influential philosophers of the latter half of the 19th century. Among his works are *Metaphysics, Logic* and *History of Æsthetics in Germany.*

Loubet, *Loo" beh',* **Emile** (1838-), a president of the French Republic, born at Marsanne. He entered the legal profession and rose rapidly in public favor. In 1876 he was made a member of the Chamber of Deputies, entered the Senate in 1885, and became its president, and also president of the council. In 1887 he had charge of public works, and in 1899 was elected president of France, continuing in this position until 1906. His administration was marked by the initiation of the movement which resulted in the law (1905) separating Church and State. He was succeeded in the presidency by Clément Fallières.

Louis, *Loo' is,* the name of 18 kings of France. Louis I, surnamed *le Débonnaire,* born in 778, was Holy Roman emperor, succeeding his father, Charlemagne, in 814, at the same time becoming King of France. His reign lasted until his death in 840. Louis II, born in 846, son of Charles the Bald, reigned from 877 until his death in 879. Louis III, born about 863, son of Louis II, succeeded his father in 879 and died in 882. Louis IV, born in 921, reigned from 936 to 954. Louis V, the last of the French Carolingian kings, born in 967, succeeded his father Lothair as king in 986, and reigned one year.

Louis VI, born about 1080, succeeded his father Philip I in 1108, and reigned until 1137. By his quarrel with Henry I of England, the struggle between the two countries was begun which continued for three centuries. Louis VII, born about 1120, son of Louis VI, succeeded his father in 1137, and reigned until 1180. He engaged in the Second Crusade. The marriage of his divorced Queen, Eleanor of Aquitaine, to Henry II of England, taking with her as dowry the provinces of Poitou and Guienne, caused a long war between England and France. Louis VIII, born in 1187, son of Philip Augustus, succeeded his father in 1223, and reigned until 1226. He regained most of the English possessions in France, and led a crusade against Raymond of Toulouse and the Albigenses.

Louis IX, called St. Louis, born in 1215, son of Louis VIII, succeeded his father in 1226. He defeated Henry III of England in several engagements in 1242. In fulfillment of a vow he undertook a crusade to Palestine in 1248 with an army of 50,000, but was defeated and captured and forced to pay a heavy ransom. Returning to France in 1252, he devoted the next 15 years to establishing justice and prosperity throughout his country by reforming the nobility and the laws, and lightening the burdens of the people. In 1270 he undertook a second crusade, but died of a pestilence before reaching Palestine. Louis X, born

in 1289, son of Philip the Fair, succeeded his father in 1314 and reigned for two years.

Louis XI, born in 1423, son of Charles VII, succeeded his father in 1461, and reigned until 1483. He increased the territory of France and curtailed the power of the nobles, besides strengthening the power of the throne. Unscrupulous and cruel, he nevertheless furthered the interests of his kingdom by encouraging manufactures, commerce and education. Louis XII, born in 1462, son of Charles, Duke of Orleans, succeeded Charles VIII as king in 1498, and reigned until 1515. His reign was continually disturbed by wars with Italy, England, and the Holy League formed by Venice, Ferdinand of Aragon, the Pope and Henry VIII of England. Louis XIII, born in 1601, was the son of Henry IV, whom he succeeded under the regency of his mother, Maria de' Medici, in 1610. In 1624 he chose Richelieu as his prime minister, and the remainder of his reign was practically that of the great Cardinal. The political power of the Huguenots was broken and the governmental power was centralized. See RICHELIEU, ARMAND JEAN.

Louis XVII, born in 1785, died in 1795, second son of Louis XVI, was proclaimed king by the Royalists upon the death of his father in 1793, but never reigned. Louis XVIII, born in 1755, brother of Louis XVI, led a wandering life until the fall of Napoleon opened the way to the throne. He reigned from 1814 until his death in 1824. See LOUIS XIV; LOUIS XV; LOUIS XVI.

Louis XIV (1638-1715), King of France and successor to his father, Louis XIII. He became king when he was but five years of age, and during his minority his mother, Anne of Austria, acted as regent, while public affairs in general were administered by the premier, Mazarin. During these early years of his reign the French were carrying on a series of brilliant campaigns against Spain, but internal affairs were less fortunate, and at one time Anne, with Mazarin and the young King, was obliged to flee from the capital. Upon the death of Mazarin, Louis XIV began to rule, and his autocratic though prosperous reign is typified in his famous sentence *L'état c'est moi.* (I am the state.) The early part of his reign was wisely spent in improving the financial conditions of France, and industries were encouraged by a high protective policy. His foreign policy, however, involved France in a series of wars which, in his later years, he deeply regretted. Through the influence of the Queen, Maria Theresa, he revoked the Edict of Nantes and thus drove from France many of her most industrious and able workmen. By accepting the Spanish crown for his grandson, Philip of Anjou, Louis renewed the hostilities that had ceased with the Peace of Ryswick (1697), and entangled his country in difficulties which ended in her complete humiliation in the war that ensued (See SPANISH SUCCESSION, WAR OF THE).

During this time the French court was the most brilliant in all Europe and Louis's reign was made forever famous by the great men he drew around him. It was the age of Corneille, Molière and Racine in literature; of Lebrun, Poussin and Claude Lorrain in painting; and of Turenne and Condé in warfare. These names, the munificence of the King, and the splendor of the court have caused these years to be known as the Golden Age of France.

Louis XV (1710-1774), King of France, succeeded his great-grandfather, Louis XIV, in 1715, under the regency of the Duke of Orleans. He became ruler in fact in 1723. He married the daughter of the dethroned King of Poland, and became involved in war in support of his father-in-law's claims. In 1726 he made his tutor, Cardinal Fleury, his prime minister, who held this position until 1743. The War of the Austrian Succession (1740-1748), in which Louis became involved, resulted favorably to France and restored her lost colonies. But the Seven Years' War (1756-1763) was carried to America and cost France the loss of Louisiana and Canada.

Louis XVI (1754-1793), King of France during the French Revolution. In his youth he was little in sympathy with the intrigues and corruption of the French court and lived much by himself, interested chiefly in mechanic arts. In 1770 he married Marie Antoinette, the Archduchess of Austria, and in 1774, upon the death of his grandfather, he became king. His reign began auspiciously, for he set in operation many governmental reforms, court economies and personal philanthropies. He appointed Turgot minister of finance, and once more convened the Parliament. The tide of prosperity was turned by the financial embarrassment suffered through aid given to the American colonies against England, and by the opposition of the Queen to the most of the reform measures. A growing and dangerous spirit of republicanism began to threaten the monarchy, and the culmination was reached when, after the forced resignation of two inefficient ministers, Necker and Calonne, Louis's attempt to dissolve Parliament was met with defiance by Mirabeau, acting in the name of the people. In spite of the King's efforts to conciliate the people, Paris was soon filled with an infuriated mob which stormed the Bastille and later surrounded the royal palace at Versailles, compelling the King and the royal family to return to the Tuileries, where they were kept under strict guard. In an attempt to escape, the king was recaptured, was tried for conspiring against the constitution and was condemned to death. He was executed in January, 1793. See FRENCH REVOLUTION.

Louisburg, *Loo' is burg,* **Sieges of,** two famous sieges about the village of Louisburg, Cape Breton Island. The French had made Louisburg the strongest coast position in the New World. Nevertheless, it surrendered to a force of British and New England troops, June, 1745, during King George's War. The position was restored by the Treaty of Aix-la-Chapelle, 1748, but in July, 1758, during the Seven Years' War, it was again taken. The British subsequently destroyed the fortifications. Louisburg is situated in the southeastern part of Cape Breton Island. It has an excellent harbor, which is of importance as a shelter for vessels.

Louisiana, *Loo e" ze an' a,* THE CREOLE STATE, one of the South Central States and one of the Gulf States, is bounded on the n. by Arkansas and Mississippi, on the e. by Mississippi, on the s. by the Gulf of Mexico and on the w. by Texas.

SIZE. The greatest length from north to south is 280 m., and from east to west, 290 m. The area is 48,506 sq. m., of which 3097 sq. m. are water. Louisiana is a little smaller than New York, about the size of Mississippi and Delaware combined and the 30th state in area.

POPULATION. In 1920 the population was 1,798,509. From 1910 to 1920 there was a gain in population of 142,121, or 8.6 per cent. There are 39.6 inhabitants to the square mile and the state's rank in population is 22.

SURFACE. Along the Arkansas border are elevations from 400 to 500 ft. high. From these altitudes the surface slopes gradually southward to meet the sea. The region between the Mississippi and Sabine rivers is a flat country crossed in the northern part by the Ouachita and Red rivers, whose valleys are separated by a low divide. The land along the Mississippi and in the southern part of the state is low and flat. In many places the farms are protected from overflow from the river by levees. This part of the state is of recent formation and consists of land formed from the silt brought down and deposited by the river. The delta of the Mississippi extends far out into the Gulf, and is growing in this way year by year. The coast is bordered by marshes and lagoons of brackish water, some of which are so enclosed as to form lakes.

RIVERS AND LAKES. The Mississippi forms the northern part of the eastern boundary, then crosses the southern half of the state in an irregular southeast course. The river here has its largest volume of water, and exerts a powerful

influence on the country bordering on its banks. The Ouachita crosses the northern boundary a little east of the center and flows southward, uniting with the Red just above where that stream enters the Mississippi. The Red River, next to the Mississippi the most important stream, enters the state near the northwest corner and flows diagonally across it to the southeast, uniting with the Mississippi where that stream begins to cross the state. The Sabine forms about two-thirds of the western boundary and flows directly into the Gulf. The Bœuf in the northeast and the Little Saline in the central part of the state are important tributaries respectively of the Ouachita and the Red. The streams in the southern part of the state are relatively short. All of the rivers are sluggish and flow through tortuous channels.

Louisiana has a large number of lakes. However, most of them are bayous or lagoons. The latter are found along the rivers and are formed by a change in the channel of the stream. They are usually long and narrow and have the form of the arc of a circle.

Climate. Louisiana has a semitropical climate with hot summers and warm winters, except in the northern part of the state, where the thermometer may fall several degrees below freezing point. Here, however, there are only three months in which frost occurs. The rainfall varies from 60 inches in the southeast to 50 in the north.

Minerals and Mining. During the Civil War a deposit of salt was discovered in Petite Anse Island and it has been worked ever since. In some places this deposit is over 1000 ft. thick, and the salt is of remarkable purity. Other deposits have also been discovered on Orange Island. Near Lake Charles are extensive beds of sulphur. The beds are several hundred feet underground, and the sulphur, which is 99 per cent pure, is obtained by superheated water forced through the beds by compressed air. The dissolved sulphur is brought to the surface, where it is cooled in large tanks in the open air. Next to the sulphur mines in Sicily these are the most important mines in the world. There are important oil fields near Jennings, Shreveport and Mansfield. Natural gas occurs near Mansfield and Shreveport. Some kaolin and iron ore are found in the state.

Forests and Lumber. The uplands contain extensive forests of long-leafed and short-leafed pine, and in the lowlands are forests of red and white cypress. Ash, oak, beech, walnut and other trees are found on the bluffs along the rivers. Louisiana has a good supply of forest and timber, and lumbering is one of the important industries of the state.

Agriculture. The soil of most of the state is a deep, rich alluvium capable of producing abundant crops of whatever can be grown in a warm temperate or semitropical climate. Cotton and sugar cane are the two great staples. The annual yield of cotton is about 700,000 bales. This is grown mostly on the uplands. Sugar cane is raised in the southern part of the state, and three-fourths of all that is produced in the United States is grown in Louisiana, making this the leading state in the production of sugar (See Sugar). On the lowlands west of the Mississippi and bordering the Gulf there are extensive rice fields, and Louisiana is the leading state in the production of this cereal. Corn is grown in all parts of the state for home consumption. In the northern part fruits are raised for the Northern markets. Dairying is increasing in importance and sufficient live stock is raised to supply local needs.

Fisheries. Louisiana is the second only to Florida among the Gulf States in the value of her fisheries. The oyster fisheries are of chief importance and are second only to those in Chesapeake Bay. The principal beds extend from the mouth of the Atchafalaya River to the state line. Shrimp and catfish are also taken in large numbers. Alligators are caught for their hides.

Manufactures. The production of sugar is the chief manufacturing indus-

try and it contributes about two-fifths of the value of the manufactured products of the state, the annual output amounting to about $48,000,000. The manufacture of lumber and lumber products is second in importance. The other industries include the manufacture of cottonseed oil and cake, cleaning and hulling rice, refining cottonseed oil, the manufacture of fertilizer from cottonseed, making and repairing railway cars, making machinery and the manufacture of cotton goods. New Orleans is the chief manufacturing center.

Transportation and Commerce. Including the Mississippi, Louisiana has over 3700 m. of navigable rivers. The Red, Ouachita, Sabine and Atchafalaya are all navigable. Railroads extend across the state from east to west and from north to south. The most important systems are the Illinois Central, the Louisiana Railway & Navigation Company, the Southern Pacific, the Texas Pacific, the Louisiana & Nashville and the Queen & Crescent. New Orleans is the chief railroad center and the chief river port and seaport.

The commerce of the state is extensive because New Orleans is the chief port for a large amount of trade that comes down the Mississippi from the states farther north. Sugar, cotton, lumber, fruits, salts, sulphur and petroleum are exported. Manufactured goods and foodstuffs are imported.

Government. The present constitution adopted in 1898 has been amended several times, the last amendment being in 1913. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor and treasurer, each elected for four years. The Legislature consists of a Senate of 41 members and a House of Representatives that cannot exceed 116 members, all elected for four years. Sessions of the Legislature are biennial and limited to 60 days.

The judicial department comprises a Supreme Court of one chief justice and four associate justices elected for 12 years, and a Court of Appeals consisting of three judges elected from three separate districts. The state is divided into four Supreme Court districts, and 32 judicial districts in which the district judges hold court.

Education. The public schools are in charge of a state board of education, consisting of the state superintendent of public education and five other members appointed by the governor. A board of education for each parish is elected, whose members serve for six years. The parish board appoints a county superintendent. The school fund is derived from state and local taxation. Separate schools are provided for white and colored children. Since 1890 the schools have made rapid advancement. Graded schools and high schools are maintained in the large cities and towns. There is a state normal school at Natchitoches and a city normal school at New Orleans. The Louisiana Industrial Institute at Ruston, Southwestern Industrial Institute at Lafayette and Southern University for colored students at Baton Rouge are state institutions. The state university and agricultural college is at Baton Rouge, and is at the head of the educational system. The higher institutions not under control of the state are Centenary College at Shreveport; and Tulane and Marquette universities at New Orleans.

State Institutions. The hospitals for the insane are at Jackson and Pineville. Charity hospitals are maintained at New Orleans and Shreveport. The state schools for the deaf, dumb and blind are at Baton Rouge.

Cities. The chief cities are Baton Rouge, the capital; New Orleans, Shreveport, New Iberia, Lake Charles, Alexandria and Monroe.

History. Louisiana, named for Louis XIV of France, was first visited in 1519 by Alonso Alvarez de Piñeda, who entered the mouth of the Mississippi. In 1541, De Soto explored the land on both sides of the river above the present site of Baton Rouge. In 1682 La Salle, sailing down to the Gulf, from Canada, claimed the country in the name of

France. D'Iberville made the first permanent settlement at Biloxi (now Ocean Springs, Mississippi), in 1699. The next year a fort was established, 70 m. up the Mississippi, to block the passage of the English. Crozat, who in 1712 had been given Louisiana and exclusive control thereto, relinquished it in 1718 to the Mississippi Company, or Company of the Indies, organized by John Law.

Bienville was made governor. Moving from Biloxi, he founded New Orleans in 1718. In 1733 Louisiana was declared a royal province. Thirty years later, by a secret treaty, France gave to Spain New Orleans, the island on which it stands and all her land west of the Mississippi. That same day she ceded to Great Britain all her remaining American territory. In 1800, by cession from Spain, France again possessed Louisiana (west of the Mississippi). In 1803 Napoleon sold this territory to the United States for $15,000,000.

Reduced to its present bounds, Louisiana became a state in 1812. In the war of that year, General Jackson and 5000 men defended New Orleans from the English (See NEW ORLEANS, BATTLE OF). In 1852 Baton Rouge became the capital. Louisiana seceded in 1861. As the Union forces occupied New Orleans after May, 1862, the state's commercial sufferings from the Civil War were severe; moreover, after the war, its political and economic reconstruction was slow. Finally, in 1868, the Fourteenth Amendment was agreed to and in 1879 a new constitution was adopted. In 1884 the New Orleans Exposition took place. Since the adoption of the new constitution in 1898 the state has made steady progress in the development of her resources and along educational lines.

GOVERNORS. William C. C. Claiborne, 1812-1816; Jacques Villeré, 1816-1820; Thomas B. Robertson, 1820-1822; Henry S. Thibodaux, 1822-1824; Henry S. Johnson, 1824-1828; Pierre Derbigny, 1828-1829; Armand Beauvais and Jacques Dupré, 1829-1831; André B. Roman, 1831-1835; Edward D. White, 1835-1839; André B. Roman, 1839-1843; Alfred Mouton, 1843-1846; Isaac Johnson, 1846-1850; Joseph Walker, 1850-1853; Paul O. Hébert, 1853-1856; Robert C. Wickliffe, 1856-1860; Thomas O. Moore (Confederate), 1860-1862; George F. Shepley (Union military governor of New Orleans), 1862-1864; Henry W. Allen (Confederate), 1864-1865; Michael Hahn (Union governor of New Orleans), 1864-1865; James M. Wells, 1865-1867; Benjamin F. Flanders (military governor), 1867; Joshua Baker (military governor), 1867-1868; Henry C. Warmoth, 1868-1873; Pinckney B. S. Pinchback, 1873; John McEnery, 1873; William P. Kellogg, 1873-1877; Stephen B. Packard, 1877; Francis T. Nicholls, 1877-1880; Louis A. Wiltz, 1880-1881; Samuel D. McEnery, 1881-1888; Francis T. Nicholls, 1888-1892; Murphy J. Foster, 1892-1900; William W. Heard, 1900-1904; Newton C. Blanchard, 1904-1908; Jared Y. Sanders, 1908-1912; Luther E. Hall, 1912-1916; Ruffin G. Pleasant, 1916-1920; J. M. Parker, 1920—.

Louisiana Purchase, the purchase by the United States from France in 1803 of the territory known as the Province of Louisiana. News reached the United States in the spring of 1802 that Spain, by the secret Treaty of San Ildefonso concluded in 1800, had returned Louisiana to France. This announcement caused uneasiness on the part of American statesmen, as they felt that this move revealed the policy of France to regain her foothold in America. President Jefferson was alarmed at the prospect of danger arising from the proposed transfer and declared in his annual message that the day France took possession the friendship then existing between France and the United States would be at an end, and that the United States must henceforth ally herself with the British nation. The President also wrote to the American minister at Paris, Robert R. Livingston, that if France considered Louisiana indispensable to her interests she might cede the Island of New Orleans and the Floridas to the United States.

In January, 1803, James Monroe was selected to act as minister-plenipotentiary with Livingston. The war between England and France had been renewed, and Napoleon doubted the ability of France to hold his territory in America against such a power; he therefore, through Talleyrand, proposed to sell the entire Province of Louisiana. An agreement was finally made by the promise of the United States to pay 80,000,000 francs ($15,000,000) to France, this sum to include 20,000,000 francs ($3,750,000) for the debts of Americans to French citizens, which the United States was to assume. The agreement was signed Apr. 30, 1803, and ratified Oct. 20.

The treaty provided that the people of Louisiana should have full rights and enjoyment of citizens of the United States, and that the ships of both Spain and France should for 12 years enjoy special privileges of entry at New Orleans. The total cost to the United States was about $27,267,000, and the area purchased exceeded 1,000,000 sq. m. It included nearly all the area that now constitutes 13 states, with a population in 1910 of about 15,000,000. See UNITED STATES, subhead *Acquisition of Territory*.

Louisiana Purchase Exposition, an international exposition held in the city of St. Louis, Mo., from Apr. 30 to Dec. 1, 1904, having for its object the celebration of the 100th anniversary of the transfer of the territory of Louisiana from France to the United States. In April, 1901, the Louisiana Purchase Exposition Company was incorporated with a capital of $6,000,000 and a site selected for the great fair in Forest Park, a tract of 1142 acres within the western limits of the city. The architectural plan comprised 15 exhibition buildings, which were so laid out as to produce an excellent artistic effect. Thirty-four states and territories made appropriations amounting to nearly $5,000,000, part of which was expended in special buildings. The National Government also appropriated $5,000,000. Foreign governments were largely represented and many of them erected structures of considerable beauty and originality. The total cost to the exposition company before the fair opened was nearly $20,000,000. The total attendance was about 21,000,000; the receipts, including congressional, state and municipal appropriations, were $31,586,333, and the disbursements $30,657,861.

Louisiana State University and Agriculture and Mechanical College, at Baton Rouge (1860). This institution was established in 1855 as the State Seminary of Learning; and opened in 1860, at Alexandria. Suspended during the Civil War, it was removed to Baton Rouge in 1869; and in 1877 the agricultural college, opened at New Orleans in 1874, was merged with the university. It maintains experiment stations at Baton Rouge, New Orleans and Calhoun, has a library of some 30,000 volumes and in 1910 reported over 600 students. It is not open to women. See TULANE UNIVERSITY OF LOUISIANA.

Louis Napoleon. See NAPOLEON III.

Louis Philippe (1773-1850), King of France from 1830 to 1848. He was the eldest son of Duke Louis Philippe Joseph of Orleans and Princess Louise Marie Adelaide. He was well educated and early entered the National Guard, where he won some renown for his military service. Because he was believed to be interested in a conspiracy to place himself upon the throne, the arrest of Louis was ordered, but he fled to Austria, where, unrecognized, he secured a position as a teacher. Later he traveled in the United States and England, returning to France only after the downfall of Napoleon and the accession of Louis XVIII. He was not cordially welcomed at court until after the coronation of Charles X, with whom he maintained pleasant relations. After he became king in 1830, France enjoyed unusual prosperity in industrial lines, but Louis's policies made him hated by the extremists of France and distrusted by foreign powers. When he and his minister Guizot opposed certain electoral reforms, an insurrection broke out (1848)

which drove him from the throne. He spent his remaining years in England.

Louisville, *Loo' is vil,* **Ky.,** a city, county seat of Jefferson Co. and commercial metropolis of the state, 110 m. s.w. of Cincinnati. Louisville is situated on the Ohio River and on the Baltimore & Ohio Southwestern, the Illinois Central, the Chesapeake & Ohio, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Louisville & Nashville, the Louisville, Henderson & St. Louis, the Big Four and the Monon railroads. A number of steamboat lines connect the city with Memphis, Cairo, Cincinnati and Evansville, and other river ports of the Ohio and of the Mississippi valleys. There is an extensive system of street-railway and interurban electric lines. The Ohio is here spanned by three bridges, and there is a ferry connecting Louisville with Jeffersonville, a handsome residential suburb. In 1830 the Louisville and Portland Canal, nearly two miles long, was constructed around the rapids on the Kentucky side, for use at time of low water. In 1874 this canal passed under Federal control. The excellent transportation facilities and the richness of the surrounding region in agricultural products and in coal and iron have made Louisville an important manufacturing and industrial city.

Parks and Boulevards. Louisville has an extensive park system, organized in 1891. Third Street Boulevard extends from the center of the city to Iroquois Park of 670 acres; Cherokee Park of 730 acres lies at the east end of Broadway, and Shawnee Park lies at the west end. Central Park of 18 acres, and Boone and Baxter squares occupy a place in the old residential districts. The newer residences are on the highlands at the east and west ends of the city. The streets intersect at right angles and are generally wide and beautifully shaded. The numerous handsome residences are surrounded by well-kept lawns and gardens. The wholesale district and the great tobacco warehouses are not far from the river and lie along Main Street, which runs east and west. The shopping district is along Fourth Street in the heart of the city. There is practically no tenement district, as a large per cent of the wage earners own their homes or rent small cottages.

Public Buildings. The most noteworthy public building is the courthouse, containing a marble statue of Henry Clay, by Joel T. Hart. A bronze statue of Thomas Jefferson, designed by Moses Ezekiel, stands in front of the building. Other prominent buildings are the city hall, the Federal Building and the city public library. The city also contains a large number of banks, fine hotels, theaters, substantial business houses and about 240 churches, many of which are fine specimens of ecclesiastical architecture. Several imposing Catholic cathedrals add to the beauty of the city.

Institutions. The chief educational institution is the University of Louisville, with law and medical departments and a College of Liberal Arts. Among other educational institutions are the Southern Baptist Theological Seminary, the Louisville College of Pharmacy, the Presbyterian Theological Seminary of Kentucky, the Louisville College of Dentistry, the male and female high schools, a manual-training school, a normal school and about 25 Catholic schools. The benevolent and charitable institutions include the Kentucky Institute for the Blind, in connection with which is the American printing house for the blind; the Children's Free Hospital, a number of state hospitals and many private charities.

Industries. The leaf-tobacco market of Louisville is the largest in the world. There is also a notably large trade in pork, wheat, corn, coal and lumber. There are extensive manufactories of packed meat, men's clothing, cottonseed oil and cake, agricultural implements, wagons and carriages, sole leather, cast-iron pipes and plumbers' supplies, brass fittings, furniture, cement and other manufactured products. Louisville was formerly one of the greatest distilling centers in the country and is now an important market for live stock.

HISTORY. The first settlement was made in 1778 by about 20 families who came down the river under the leadership of Col. George Rogers Clarke. The city of Louisville was founded the following year and named in honor of Louis XVI of France. The first city charter was granted by the Kentucky Legislature in 1828. On account of its excellent transportation facilities and superior location, the city has had a rapid growth. Population in 1920, U. S. census, 234,891.

Louse, a family of disgusting and annoying parasites of the order Hemiptera. The most uncomfortable of these are the body louse and the head louse, which are parasitic upon man. They attach their eggs to the base of the hair or to the clothing and hatch there into tiny insects which from the first closely resemble the adult. They are flat-bodied, short-legged creatures, with short antennæ, broad heads and bulging eyes. Since these pests live only upon dead tissue, cleanliness is the surest preventive. Infested houses may be cleansed by closing them tightly for 24 hours and evaporating a few ounces of carbon bisulphide within. This kills the insects but not the eggs, so the process should be repeated after a week's interval.

Lice which infest birds, poultry and domestic animals, belong to a closely related family. Plenty of fine dust in cages and roosts aid the birds, chickens and turkeys in destroying the pests which annoy them. Horses, cows and such farm animals may be well groomed and then brushed with a kerosene emulsion diluted five times, or painted with a carbolic or tobacco wash. Where the infested herd is large, a spray of the emulsion (diluted nine times) may be employed while allowing the herd to pass singly through a narrow gateway. This process should be repeated at weekly intervals until the pest disappears. The plant lice, or aphids, belong to another division of this same order. See APHID; INSECTICIDE.

Louvre, *Loo' vr',* **Palace of the,** a group of magnificent buildings in Paris, built in the center of the city, on the north bank of the Seine. The main building was begun in 1204, and was early used as a fortress, prison and arsenal, occasionally also as a royal residence. Francis I reconstructed the building in 1541, and employed Jean Goujon, one of the most famous decorative sculptors of the French Renaissance, to do the work. His plans were naturally left incomplete and the work was continued by several successive French kings. At the time of the French Revolution, Napoleon I turned it into a national gallery and museum, when he returned from Italy with the rich, artistic spoils which he had captured, and the whole was magnificently completed by Napoleon III. It contains the most valuable treasures in any one building in the world. All departments of the institution are in the hands of specialists and have been carefully catalogued and arranged. Since 1882 a school has been maintained in connection with the Louvre, and advanced courses are offered in archæology and art.

Love Bird, a name given to the smallest of the parrots, which do not exceed six inches in length. Their name was given them because of the affection displayed toward each other. They are inhabitants of Africa, and about nine species are known. The tail is very short and the bill is very thick and deep. A species common in zoological gardens is the rosy-faced love bird. It is pale green, with red forehead and eyebrows, rosy neck and face; the tail is scarlet, with green and black termination; and the rump and upper tail coverts are a rich blue. They build no nest of their own, but deposit the pure white eggs in the nests of other birds.

Lovejoy, Elijah Parish (1802-1837), an American abolitionist, born at Albion, Me. He graduated at Waterville College in 1826, at Princeton Theological Seminary in 1833, and entered the Presbyterian ministry, soon becoming editor of the *St. Louis Observer,* a journal of that denomination. This he made a strong anti-slavery publication. Because of the opposition of the slavery element

in St. Louis, he removed his plant to Alton, Ill., where it was three times destroyed by mobs. Upon the fourth attack, Nov. 7, 1837, he was shot and mortally wounded while defending his press. The State of Illinois has erected a monument to Lovejoy at Alton.

Lovelace, Richard (1618-1658), a Cavalier poet, born in Kent and educated at Gloucester Hall, Oxford, where he was "accounted the most amiable and beautiful person that ever eye beheld." He was twice imprisoned during the Revolution. While at Oxford he began writing. His comedy, *The Scholar,* performed there in 1636, and his tragedy, *The Soldier,* written in 1640, have been lost. While imprisoned, he arranged those poems appearing in 1649 as *Lucasta,* most celebrated of which are *Going to the Wars* and *To Althea from Prison.* Lovelace died in poverty. *Posthume Poems of Lovelace* appeared in 1659.

Lover, Samuel (1797-1868), an Irish artist and author, born in Dublin. His ballad, *Rory O'More,* early attracted attention, as also did his portrait of Paganini exhibited at the Royal Academy in 1833. He depicted Irish life with keen and farcical humor, and his plays and "Irish Evenings" (entertainments of stories, songs and recitations) proved highly popular in Canada, the United States and England. His works include *Legends and Stories of Ireland, Handy Andy, Treasure Trove* and *Songs and Ballads.*

Low, *Lo,* Seth (1850-1916), an American educator and public man, born in Brooklyn, N. Y. He graduated from Columbia College in 1870, early became interested in public affairs, and in 1882 was elected mayor of Brooklyn, in which capacity he introduced radical reforms in all departments of city administration. In 1890 he became president of Columbia College, which was removed to its present campus during his administration, reorganized on a university basis and its name changed to Columbia University. He presented Columbia with a library building valued at $1,000,000. In 1899 he was a member of the United States delegation to the Peace Conference at The Hague. Two years later he was elected mayor of Greater New York on an independent ticket, and his administration was characterized by extensive reforms in the police and finance departments.

Lo'well, Abbott Lawrence (1856-), an American educator, born in Boston. He graduated from Harvard in 1877, and from the Harvard Law School in 1880, practiced law in Boston for 17 years and then became a lecturer at Harvard. In 1899 he was made professor of science of government; and in 1909 became president of his alma mater, succeeding Charles William Eliot. Dr. Lowell succeeded his father in 1900 as financial head of the Lowell Institute of Boston. Among his works are *Essays on Government, Governments and Parties in Continental Europe* and *The Government of England.*

Lowell, James Russell (1819-1891), distinguished American poet, essayist, critic and diplomat, was born in Cambridge, Mass., February 22, on the 87th anniversary of the birth of George Washington. Elmwood, the house in which he was born, was a fine old Tory mansion, built some years before the Revolution, a square, three-storied dwelling sheltered by pines and English elms, with the winding River Charles to the right of it. Charles Lowell, the father of the poet, was a Congregational minister, a man of college training, whose natural claims to culture had been broadened by travel in Europe and contact with eminent men. Mr. Lowell married Harriet Traill Spence, an imaginative girl who had inherited a mystical strain that made her fond of repeating old ballads in the twilight. Lowell's natural fondness for books was stimulated by access to a fine library and contact with his poetry-loving mother, so that his home life tended in every way to foster a taste for literature. Moreover, in the beautiful woods and meadows about Elmwood where he was accustomed to spend hours in play, he learned to know and love

the birds and trees, gaining impressions that were later to beautify some of his best verse.

Student Days. At the private school where the boy was prepared for college he received an especially fine training in Latin, entering Harvard at the age of 15. While at college Lowell followed his bent for reading and gained some distinction among his classmates as a contributor to the college paper, but he tried the patience of the authorities severely by his indifference to formal regulations. In his senior year, as a result of his shortcomings, he was sent to Concord to pursue his studies with a private teacher, and was not allowed to rejoin his class until the Saturday before Commencement. Lowell took his exile cheerfully enough, wrote the class poem, which he had printed for distribution among his classmates after graduation, and made the acquaintance of Emerson. On leaving college, Lowell decided, not without some hesitation, to follow the profession of law, and was admitted to the bar in 1840, after a course at the Harvard Law School. His time, however, was not given up wholly to his law studies. He read constantly, enjoying especially the classic Latin authors and the Greek and early English dramatists.

Early Literary Ventures. About the time that he took his degree in law, Lowell became engaged to the sister of one of his classmates, Miss Maria White, a young woman whose influence on her poet-lover was to be considerable. Her superior qualities of mind, for she herself was a poet of no ordinary ability, and high faith in his powers meant everything to the young man, at that time distrustful of the plans and hopes for a literary career, which were beginning to shape themselves. What sympathy he had previously felt for the abolition cause became, through her influence, genuine devotion to the anti-slavery movement, and from the year 1840 his poems and letters were full of the question. This period marks, too, the beginning of that kindly feeling for humanity that is so stamped on his writings. A volume of poems entitled *A Year's Life,* published in 1841, was the first evidence of a new stimulus in his life. This was followed by contributions in prose and verse to several magazines. Feeling more and more a distaste for law, he definitely abandoned it, and attempted, in 1843, to establish a literary journal in New York, *The Pioneer,* a venture that failed, but which made him all the more determined to devote his talents to literature. He now began to write regularly, publishing a collection of poems at the close of 1843, and the following year, his first critical prose studies, *Conversations on Some of the Old Poets.*

Period of Development. Shortly after his marriage in December, 1844, Lowell began work in Philadelphia as an editorial writer for the *Pennsylvania Freeman,* but the following May he returned to Elmwood, where, stimulated by the companionship of his wife, he found his literary powers gradually ripening. By the year 1848 he had written anti-slavery articles for the *London Daily News,* begun contributing to the *National Anti-Slavery Standard* of New York, and published a series of poems and his well-known long poems, *A Fable for Critics, Biglow Papers* (first series) and *The Vision of Sir Launfal.* This period of development, in which Lowell gained a wide reputation as a man of letters, was made sorrowful by the death of three of his children, and more than all by the death of his wife in 1853, following a trip to Europe. The prose volume, *Fireside Travels,* is a collection of travel sketches relating to this journey.

Professor at Harvard—Prose Period. In January of 1855 Lowell received notice of his appointment to succeed Longfellow in the Smith professorship of languages and literature at Harvard. After concluding a course of lectures in Boston and the West, he went to Europe for a year of travel and study, beginning his work at Harvard in September, 1856, and continuing it for 20 years. In 1857 he married Miss Frances

Dunlap, the governess of his little daughter Mabel. Lowell now entered upon a prose period, for, though he did produce some poetry, his work consisted chiefly of editorial and critical writing. He became the first editor of the *Atlantic Monthly,* founded in 1857, holding the important position until 1861, and from 1862 to 1872 was connected editorially with the *North American Review.* Perhaps the noblest work of this period was his *Commemoration Ode,* which he recited at the Harvard College memorial exercises held in honor of the Harvard students who had died during the war. This great ode expresses the best there was in the author. In 1868 appeared a collection of the poems written since 1848, entitled *Under the Willows,* and in 1870, *Among my Books,* a reprint of some of his literary essays. This was followed in 1871 by *My Study Windows,* another collection of literary essays. In 1872, accompanied by his wife, he made his third trip to Europe.

Later Years. On his return to Elmwood in 1874 Lowell began to take an active interest in political questions. In 1877 he was appointed ambassador to Spain, being transferred to the English court three years later. Lowell's striking success as a representative of his country was due partly to his executive ability and partly to his social, oratorical and literary gifts. His recall in 1885 was received by the English people with genuine regret, and Queen Victoria is recorded to have said that no other ambassador during her reign had created so much interest and been so highly esteemed as Mr. Lowell. The sudden death of his wife in 1885 was a sorrowful conclusion to this period of personal triumph.

After his return to America Lowell resumed his literary work, lecturing, writing and finding pleasure in the many friendships he had formed with men of letters both in America and abroad, for he made several trips to England during this closing period. One of his last tasks was the revision and preparation for the press of the collected edition of his works in poetry and prose, published in 1890 in ten volumes. He died at Elmwood on the 12th of August, 1891.

Literary Qualities. Lowell's personal letters, edited after his death by Charles Eliot Norton, express his interesting personality in a delightful way. They are pervaded with a genial humor that is sometimes sentimental, sometimes almost boyishly playful, and are suggestive of that quick sympathy for humanity and nature which is one of his strongest traits. In them, too, we find traces of a deeply affectionate Lowell who was unashamed of any frank expression of his love for his family and friends. His spontaneity, sincerity and enthusiasm kept him young in spirit through his long and varied career as a writer, professor and public man, and it is this freshness of spirit and vigor that keeps his work, scholar as he was, for the most part free from bookishness. The many-sided nature of this author is expressed in the variety and copiousness of his writings. He was superior in the field of literary criticism, a profound student of political questions, a poet of nature and a writer of humorous verse. He rose to heights of exaltation in his stately memorial odes, and wrote tenderly and simply of his grief over the death of his little daughter, in *The First Snowfall;* the same poet who produced that famous political satire, *Biglow Papers,* unsurpassed in American literature as an example of humorous, satiric verse. In view of his richly endowed mind and his many-sided intellect, Lowell is justly regarded as our representative man of letters, the highest type of American culture.

Lowell, Mass., a city and one of the county seats of Middlesex Co., 26 m. n.w. of Boston, on the Merrimac River at the mouth of the Concord, and on the Boston & Maine, the New York, New Haven & Hartford and other railroads. The site of the city is uneven and picturesque. It has an area of about 14 sq. m. Interurban electric lines connect with all the near-by towns and cities. Lowell is noted for its large annual out-

put of manufactured articles. The falls of the Merrimac descend 32 ft. at this point, which, together with the power supplied by the Concord River, furnish immense motive power for manufacturing purposes. By means of a system of canals, water power is furnished to many Lowell factories, then returned to the Merrimac to be used lower down the river for the mills of Newburyport, Haverhill and Lawrence.

The city contains the Lowell Tuberculosis, Lowell General, Corporation and St. John's hospitals, St. Peter's and Theodore Edson orphanages, Ayer Home for young women, St. Patrick's Home and an old ladies' home. Among the educational institutions are a state normal school, Rogers Hall School and St. Patrick's Academy. The Lowell Textile School, opened in 1897, offers courses in cotton and wool manufacturing, textile engineering, chemistry and dyeing, and is rated as the leading institution of its kind in the world.

The prosperity of Lowell is mainly derived from the manufacture of cotton and woolen goods. The products of the textile mills include cotton sheetings, felts, shirtings, prints, drillings, carpets, serges, cassimeres, hosiery, shawls, beavers and elastic and knit goods. There are also extensive manufactories of machine-shop products, carriages, furniture, turbine wheels, hydraulic presses, bobbins and machinists' tools, patent medicine, boilers, paper, rubber heels, chemicals, boots and shoes, perfumery and cosmetics and automobile tires. The city has one of the largest bleacheries in the country.

Lowell has many points of scenic and historic interest, including the Ladd and Whitney Monument, Fort Hill Park, Pawtucket Falls, a city hall and public library of 100,000 volumes. James McNeill Whistler was born here in 1834 and in 1907 the house where he was born was purchased by the Art Association for an art museum. Lowell was named in honor of Francis Cabot Lowell, who had improved Cartwright's power loom, and who began here the manufacture of cotton goods. It received a city charter in 1836. Population in 1920, U. S. census, 112,479.

Loyo'la, Saint Ignatius of (1491-1556), the founder of the Society of Jesus, or Jesuits, was born in the Castle of Loyola, near Azpeitia, Spain. He chose the career of a soldier, and was severely wounded in 1521. This changed the course of Loyola's life. Upon his recovery he renounced the world and entered the Church. At the completion of his novitiate he went to Paris, where, for a number of years, he devoted himself to general and theological study. Here, in 1534, he induced Francis Xavier, Lainez and others to join him in forming the nucleus of the Society of Jesus. The final plans of the order were confirmed by Paul III in 1540. St. Ignatius governed the society he founded, from its inception until his death. See JESUITS.

Loyson, *Lwah" zong'*, **Charles,** better known by his monastic name, **Père Hyacinthe** (1827-1912), a noted French preacher, born at Orléans. He received his education at Pau and the Theological Seminary of St. Sulpice in Paris. Ordained as priest in 1851, he served for ten years as professor in seminaries at Avignon and Nantes, entered the convent of the Carmelites in Lyons, and joined that order in 1863. His preaching at once attracted attention for its eloquence and aroused intense enthusiasm, and in 1865 he was called to the Notre Dame in Paris. For his boldness in criticizing what seemed to him abuses in the Church, he was expelled from the order. When the Vatican Council in 1870 declared in favor of papal infallibility, Père Hyacinthe united in the protest and joined the Old Catholic movement. He founded the Gallican Church in Paris in 1879 and served as its rector for a number of years, later preaching in Old Catholic and Protestant churches in Switzerland.

Lub'bock, Sir John (1834-1913), a British scientist and statesman born in London. He studied at Eton and entered the banking business with his father, continuing in this line for many years

and holding many positions of trust and honor both in the commercial world and in the State. He was also officially connected with educational affairs. He was elected to Parliament in 1858, where he served at intervals for 42 years. In 1900 he was made the first Baron of Avebury. In addition to his work in the financial and educational world, Sir John accomplished much in the fields of archæology and anthropology, and wrote books on insect life and botany. His books on scientific subjects were so written as to appeal to the ordinary reader, and did much to popularize science.

Lü'beck, one of the three city states of the German Empire, consisting of the free city of Lübeck, the territory between Prussia, the Baltic Sea, Mecklenburg and Oldenburg, and nine tracts of territory in Holstein, Mecklenburg-Strelitz, Oldenburg and Lauenburg. Its area is 115 sq. m. The commerce of Lübeck, chiefly with Denmark, Sweden and Russia, is more important than its manufactures, which consist mainly of the production of machinery, ironware, chemicals, spirits and preserves. In 1875 a democratic constitution was adopted, and the government of the city does not differ materially from that of Hamburg. It was founded by Count Adolphus III of Holstein in 1143, and was declared a free imperial city by Frederick II in 1226.

Lu'cas, Edward Verrall (1868-), an English author. Early in his literary career he was connected with the London *Globe* and with the London *Academy*. The charm of his writings, which consist mainly of descriptive sketches and stories, is due chiefly to the grace and lucidity of his style and his quaint humor. His publications include *A Wanderer in Holland, A Wanderer in London, Anne's Terrible Good-Nature, Over Bemerton's, The Slowcoach, Old Lamps for New* and *London Lavender*. He also edited the *Works and Letters of Charles and Mary Lamb*.

Lucern, *Lu sern'*. See ALFALFA.

Lucerne, *Lu surn,'* a city of Switzerland, the capital of a canton of the same name, situated near the shores of Lake Lucerne. The surrounding range of imposing mountains makes its site one of the most picturesque in the world. The older part of the city is medieval in its architecture, and there are several statues and works of art of great beauty. The public buildings are impressive, and one of the finest among these is the International Museum of War and Peace, dedicated in 1902. Lucerne was a town in the 11th century; it belonged to the House of Hapsburg until 1332, at which time it entered the Federation.

Lucerne, Lake of, a lake of Switzerland, one of the most beautiful in Europe. It is situated in the north-central part of the country and is bordered by the cantons of Lucerne, Schwyz, Uri and Unterwalden. Its shape is that of an irregular cross. It is about 23 m. in length, from 1½ to 2 m. in width, has a maximum depth of 702 ft. and is 1434 ft. above sea level. The surrounding country is beautiful, the gloomy peak of Mt. Pilatus standing on one shore and opposite it the sunlit, garden-covered Mt. Rigi, commanding an unsurpassed view. The different basins of the crosslike body are the Bay of Lucerne, the Alpnach and Küssnacht bays, the Lake of Uri, the Buochser See and the Weggiser See. The Axenstrasse, known as one of the most beautiful roads in existence, and a remarkable engineering feat, winds along the eastern shore. The lake is a favorite resort for tourists. See TELL, WILLIAM.

Lucian, *Lu' shan,* (about 120-about 200), a Greek writer, born at Samosata, in Syria. He was first apprenticed to his uncle, a sculptor, but ran away after being cudgeled for ruining a fine marble slab, and, as a result of the influence of his mother, was enabled to turn to literature through his early study of rhetoric. Known first as a lecturer and declaimer, he afterwards wrote essays and dialogues which caused him to be ranked with the great prose writers of the world. His satire was keen and brilliant. Among his works are *Herodotus, Dialogues of the Gods, Dialogues of the Dead* and *Dialogues of Courtesans.*

Lucifer, *Lu' si fer,* (Greek, Phosphorus), the ancient name for Venus, appearing as the morning star. The same planet, as the evening star, was called Hesperus. Both were represented as a handsome youth with torch of flame.

Luck'now, a city of British India, capital of Oudh, situated on the Gumti River, 675 m. by rail n.w. of Calcutta. At a distance the city is picturesque with its many domes, pinnacles and minarets, but the streets are narrow and dirty and the buildings mean and sordid. The public edifices include the palaces, the great mosque, the Canning College, a museum, a college for half-caste children, several European missions and churches and the Imambara, one of the largest rooms in the world. The trade in grain, timber, iron and raw cotton is large, and the leading industries include railway workshops and the manufacture of muslins, gold and silver brocade, shawls, velvet and lace. Lucknow is one of the oldest cities of India. It was the scene of the Sepoy Mutiny in 1857, and the memorable defense of Lucknow is noteworthy. Population in 1901, 264,049.

Lucretia, *Lu kre' shi a,* a famous heroine of Roman story, wife of L. Tarquinius Collatinus. While the Roman army was besieging Ardea, she was outraged by Sextus, son of Tarquin the Proud, King of Rome. When he had left her, she vowed her husband and father to her revenge and stabbed herself. The facts being known, the people rose against the Tarquins, whom they expelled from Rome, and the republic was established. See BRUTUS, LUCIUS JUNIUS.

Lucre'tius (Titus Lucretius Carus) (about 99-55 B. C.), a Roman poet. Little is known of the details of his life, but through his great poem, *De Rerum Natura,* he unconsciously reveals himself as one of the noblest minds in history, through his earnest seeking for the truth. His work is psychological, and his philosophy is an exalted type of Epicureanism that shuns sheer seeking of pleasure and accepts rather fortitude and renunciation as a guide to conduct. In places his work is rugged and without polish, but as a whole his appreciation of beauty and poetry is of the highest order.

Lud'ington, Mich., a city and the county seat of Mason Co., about 85 m. n.w. of Grand Rapids and the same distance n.e. of Milwaukee, Wis., on Lake Michigan at the mouth of the Marquette River and on the Pere Marquette Railway. It has steamboat connection with Chicago, Milwaukee and other lake ports and direct freight connection by railroad ferry with Kewanee, Two Rivers and Manitowoc on the other side of the lake. The city has a large trade in grain, salt, lumber and manufactured products, including watchcases, game boards and printers' supplies. Settled in 1859, the place was incorporated in 1867 and chartered as a city in 1874. It was first named for Pere Marquette, who died and was buried on the site (afterwards removed to Point St. Ignace); but it was renamed in 1871 in honor of James Ludington, a local lumberman.

Epworth Heights adjoining Ludington is noted as a summer resort and for its annual Chautauqua assembly. Population in 1920, 8,810.

Lud'low, William (1843-1901), an American soldier, born on Long Island, N. Y., and educated at West Point. As an engineer he served creditably with Sherman in the South during the Civil War. Subsequently, from 1872 to 1876, he was chief engineer for the Black Hills and Yellowstone Expedition, and during the Spanish-American War he distinguished himself at El Caney and in the attack on Santiago. In December, 1898, he became the first American military and civil governor of Havana, being relieved in May, 1900. In January, 1900, he was promoted to be brigadier-general in the regular army.

Lug'worm", or **Lobworm,** a family of long, marine Annelids, or worms, found burrowing in the wet sand along the beaches of Europe and North America. The lugworm has neither eyes nor tentacles and only small, feeble feet. The head is rounded and armed with a stout proboscis. The lugworm is nearly a foot long. It is used for bait.

Luke, Saint, the author of the *Gospel of St. Luke* (See GOSPELS, THE) and of the *Acts of the Apostles,* described under its title. Eusebius and Jerome record him to have been a native of Antioch, but this cannot be determined absolutely. He was a physician and evidently a man of liberal education and was for years a close friend and companion of Paul. His Gospel and *Acts of the Apostles* possess much literary excellence.

Lumba'go, a sort of rheumatism affecting the muscles of the loins. The disease attacks suddenly, usually after exposure to cold, and sometimes quite disables the patient. The pain is often severe, ordinarily sharp and intermittent, like cramp, but may take the form of a dull, steady ache; and it may last a few hours or be protracted several weeks. One attack predisposes to others. Massage of the affected muscles should be a part of the treatment; keeping the patient warm is also important.

Lumber. In the United States the term *lumber* is applied to timber that has been sawed or split into boards, planks, joists, lath and a variety of other shapes. The term *timber* is used to designate the trees before they are made into lumber. In England, however, the term *timber* includes both the trees and the lumber made from it. Lumbering is the industry of cutting trees and preparing them for market. The chief lumber-producing countries of the world are the United States and Canada in North America; Russia, Sweden, Germany and France, in Europe; India and China in Asia; the Congo State in Africa; and the various states of the Commonwealth of Australia. The leading states in the United States are Washington, Louisiana, Wisconsin, Michigan, Pennsylvania, Arkansas, Minnesota, Texas, Georgia, Alabama, California and Oregon. According to the census of 1910, there were in the United States, in 1909, 40,671 establishments engaged in the manufacture of lumber and timber products. These establishments had a total capital of $1,176,675,000, gave employment to over 736,000 men, and manufactured products were valued at $1,156,129,000. Lumbering is the third industry in importance in the country.

LUMBERING. Lumbering is one of the oldest as well as one of the most universal of occupations. Since man began to make tools and weapons and to erect dwellings, he has made use of wood, and in every country where timber grows it is used by the inhabitants. While the lumber of the United States and European countries consists chiefly of pine, fur, spruce, hemlock and the various hard woods, that of China and Japan consists chiefly of bamboo, that of the countries of southern Asia contains much teak and that of Australia is principally eucalyptus.

Lumbering includes felling the trees, cutting them into logs, hauling the logs to mills, sawing them into the desired forms, such as boards, planks and joist, and placing these forms on the market. The methods by which these various steps are accomplished vary widely in different parts of the world and in the different parts of our own country. In China and Japan, for instance, all the work is done by men; in India and Siam elephants are employed for moving heavy timbers, and they display remarkable skill in carrying and piling the lumber.

Logging. In the white-pine regions of Canada and the United States, most of the logging is done in the winter. Camps are located in the forest where the trees are to be felled. The camp usually consists of several low log buildings, one being used for the kitchen and mess room, another for lodging the men, another for stores and others for stables. The men in each camp are organized into crews, each crew doing a special line of work and being under the immediate direction of a foreman. One crew fells the trees, another cuts them into logs, another makes and keeps in repair the roads over which the logs are hauled to the skidding place, and so on. A general foreman or superintendent directs the work of all the crews. The trees are first notched on each side by choppers, and

WHERE OUR WOOD COMES FROM

The great trees of the forests are cut down and sawed into logs.

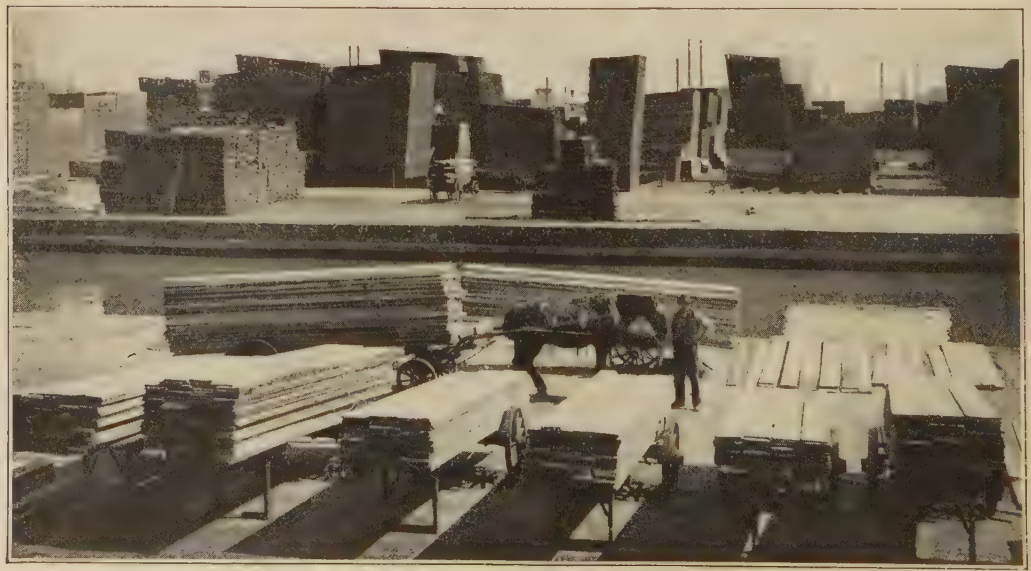
The logs are dragged away and piled upon sleds.

This is a rather heavy load for two horses to pull.

GETTING THE LOGS TO THE CITY

A train-load of felled trees on the first stage of its journey.

The logs are floated in the nearest stream down to the sawmill.



In the sawmill they are made into plank, lath, shingles, beams and other forms for the carpenter and the furniture maker.

the felling is completed by sawyers. The logs are hauled to the point from which they are to be taken to the mills, on sleds, usually drawn by four horses. The roads are graded so as to make them as nearly level as possible, and large loads are common. The logs are taken to the mills by floating them down streams or by railways. Formerly all transportation was by river, but when the forests near the streams had been cut away, it was found to be more economical to build railways into the forests than to haul the logs long distances to reach the streams. Considerable log driving, however, is still done on the Mississippi and the rivers of Canada. When the logs are hauled to the mill by train, they are usually loaded on the cars by hoisting engines.

In the yellow-pine and cypress forests of the Southern States, lumbering is carried on throughout the year, and nearly the same methods are employed as in the white-pine regions, except that the camps are not so common. In Washington, Oregon and the northern part of California the trees are so large as to make special machinery necessary for handling the logs. Platforms are erected for the choppers of the largest trees so that they can cut the trees above the swelling of the trunk near the ground, and stumps 10 and 15 ft. high are not uncommon in the deforested regions in these states. A single log often constitutes a load for one car. All movements of the logs are by steam power.

Sawing. Sawmills are usually located on streams, down which the logs are floated, or in the forests near where the timber is cut. When the logs arrive at the mill, they are usually pulled up an inclined plane by an endless chain running on sprocket wheels and containing hooks which are driven into the logs. The logs are afterwards rolled one at a time with cant hooks by men and placed on a staging, and finally set upon the headblocks of the sawmill.

In order to facilitate the rapid handling of logs, a device known as a "nigger" is employed to turn the log over, so that it will rest solidly on the headblocks.

This nigger consists simply of an arm projecting from an upright beam and operated below the floor of the building, generally from the rod of a vertical steam piston, so that considerable force in an upward direction may be exerted in turning the log over. After the log is placed properly on the headblocks, it is held securely in place by hooks, called dogs. The headblocks are bolted to the carriage, and this is made to carry the log to the saw. In large establishments, this is done usually by means of a steam feed, which consists of a long iron tube forming a cylinder with a piston fitted in it, having a piston rod equal to the length of the log. By the action of steam on the piston, the log is forced quickly up to the saw, which cuts through it, making a plank. By a system of gearing and friction pulleys, the carriage is made to return to its former place at a higher rate of speed than it was pushed forward. The sawyer or his assistants adjust the headblocks by screwing them up to the required distance to cut the next plank or to square the log. Band saws are now most generally employed in large lumber mills, having largely displaced both the circular and the gang saw, particularly in sawing boards. Elevators and conveyors are arranged to carry away all the sawdust and blocks, usually to a large furnace known as a refuse burner, where they are burned.

For conveying the boards and planks away as they are cut, various automatic devices are employed, those for boards consisting of a trimmer. This is simply a frame having four endless chains with lugs moving over it, forming a sort of elevator which hoists the boards up and against two circular crosscut saws, which, being spaced 16 ft. apart, cut the boards just that length. The refuse ends fall into a conveyor, while the boards are conveyed on moving rollers to be stacked or otherwise distributed.

Dry Kilns. When it is desired to maintain a continuous supply of lumber, dry kilns are employed, and they constitute an important feature of the modern sawmill plant, particularly in the yellow-

pine districts of the South. Unless yellow-pine boards freshly sawed are dried either in steam-heated dry kilns or smoked by fires, they become spotted after a few days' exposure to the air. Dry kilns for yellow pine usually consist of tunnels about 75 ft. long, 10 ft. high and 17 ft. wide, for the accommodation of the planks and boards, the standard length of which is 16 ft. They are piled crosswise on trucks with a piling strip one inch thick separating each board, for the purpose of letting the heated air pass between them so as to hasten drying. The trucks run on rails.

Steam dry kilns are of two types. In one of these a large fan is used to exhaust the air, which is heated to about 160° F., from around the coils, and to force it through the kilns into and around the piles of lumber. The other simply has coils of pipe laid under the lumber. In the former plan, ventilation is provided for and maintained by the force of the air, through suitable outlets generally in the floor of the dry kiln, while in the latter plan, tall wooden chimneys or ventilating stacks draw out the moisture produced by evaporation. Sawmills cutting 100,000 ft. of one-inch yellow-pine boards per day require at least 12 standard-size kilns with large platforms for loading and unloading.

PRESERVATION. Of the different methods of preserving lumber from decay, the simplest is that of subjecting the materials to steam at high pressure, say 200 to 250 lb. per square inch, in a closed receptacle. Various chemical and patented processes under different names have also been employed, but the creosoting process (See CREOSOTE) is the most valuable, for the reason that it not only arrests decay in wood generally, but under water as well, and also prevents the worm called the teredo (See TEREDO) from destroying the timber of wharves. Localities on the South Atlantic seaboard and on the coast of the Gulf of Mexico are subject to serious depredations from this worm. The creosote is forced by great pressure into the wood, while it is enclosed in a hermetically sealed tank, which holds about a carload of lumber. See FORESTRY.

Lump'y Jaw, or **Wooden Tongue,** a disease common among cattle and occasionally afflicting man. It is supposed to come about through the eating or handling of grasses or grains which are affected by a certain fungus or through eating raw meat. The jaw or other parts of the mouth are usually affected, although it is known to attack other parts of the body, notably the intestines and the bones. The disease develops slowly and causes a formation of tumorlike tissue, which may be treated with applications of potassium iodide or cut out. Cattle suffering from lumpy jaw seldom recover without assistance. Veterinarians call the disease actinomycosis.

Lu'nacy. See INSANITY.

Lu'nar Caustic, *Kaus' tik,* a preparation of silver nitrate obtained by dissolving silver in nitric acid and used by physicians and surgeons in cauterizing wounds. For surgical work it is put up in sticks, or pencils, which are gray-white when fresh but blacken upon exposure to the air. It leaves a dark stain upon the skin or upon any organic matter, and for this reason is employed in the manufacture of copying inks. Its value in surgery consists in its power to burn away diseased tissue and so render a wound antiseptic.

Lun'dy, Benjamin (1789-1839), an American abolitionist of Quaker ancestry, born in Hardwick, N. J. In early manhood he moved to Ohio, where he organized "The Union Humane Society" to fight slavery, and wrote anti-slavery articles for the papers. He founded at Mt. Pleasant, in 1821, the *Genius of Universal Emancipation,* the first anti-slavery journal in America. The paper was moved to Baltimore in 1824, and later to Washington, where, after a few years, it failed. In 1836 he started the *National Inquirer* in Philadelphia, but retired from it two years later. In 1838 Lundy's property was destroyed by a mob, and he removed to Lowell, Ill., with the intention of renewing the publication of the *Genius of Universal Emancipa-*

tion, but his plans were frustrated by death.

Lundy's Lane, Battle of, one of the most obstinate engagements of the War of 1812, fought July 25, 1814, at Lundy's Lane, near Niagara Falls, on the Canadian shore. The Americans were first commanded by General Scott and then by Gen. Jacob Brown, General Riall leading a much superior number of British. As aggressors, the Americans seemed to gain the advantage in the early part of the struggle, and captured a battery with which the enemy swept all parts of the field. But at midnight, after a six-hours' fight, the result was a tie; for the Americans were too exhausted to follow the British when they withdrew. Brown and Scott were severely wounded.

Lungs, the pair of spongy, respiratory organs lying within the chest cavity and enfolding the heart and its connecting blood vessels in the hollow formed by the depression on the side of each toward the middle line of the body. Together they form a pyramidal mass, conforming to the shape imparted by the ribs to the chest cavity, and coextensive with that chamber. They are united at the top by the trachea, or windpipe, which extends downward through the middle line of the body half the length of the chest cavity, where it separates into two branches, the right and the left bronchus. Each of the bronchi separates into two branches. These are the bronchial tubes. They enter the lung, and after innumerable branchings, like the twigs of a tree, pursue their way to the surface of the lung and terminate in circular, cuplike depressions called alveoli. These alveoli, or air sacs, are arranged in groups called lobules. The aggregations of lobules, with their accompanying tissues, constitute the lobes. The smaller left lung is divided into two, the right into three lobes.

The air sacs are an essential part of the respiratory process, filling with air at each inspiration and transferring their oxygen to the multitude of tiny capillaries embedded in their membranous walls, and taking the waste material thrown off by those vessels and forcing it out of the body with the air expelled. Thus the lung exercises through them an important function, both as a nutritive and as an excretory organ. The walls of the air cells are supplied with elastic tissue, which enables the lungs to expand in response to the muscles which control them and to collapse when those muscles recoil, thus expelling the poisonous air. It is estimated that if the walls of the air cells could be flattened and placed side by side, they would cover an area of 2600 sq. ft.

Surrounding the bronchial tubes and air cells is a mass of other lung substance composed of nerves, blood and lymphatic vessels and tissues, and the whole is enclosed in a membranous bag called the pleura, which prevents friction with the walls of the chest. The disease called pleurisy is inflammation of the pleura. See RESPIRATION; CIRCULATION.

Lu'pine, a name given to a genus of wild and cultivated plants of the Pulse, or Pea, Family. They are generally herbs or shrubs with erect stems bearing leaves composed of three little rounding leaflets. The flowers hang on slender stems and are butterfly-shaped. The wild species grow as weeds in the Middle and Atlantic states and bear blue or pinkish flowers in the late spring. Those cultivated for ornaments are hardier shrubs grown chiefly in the West or in gardens in Europe. The fruit is a long pod and is the *pulse* spoken of in the Bible.

Luray' Cavern, a series of caves in Page County (near Luray), Va. The cavern consists of hundreds of stalactite chambers, many of which have never been explored. It is much smaller than Mammoth Cave in Kentucky, underlying as it does only about 100 acres, but it is celebrated for its remarkable formations, some of which resemble suspended draperies.

Lute, a musical instrument of ancient origin. The body of the instrument is in the shape of a half pear. The convex surface is ribbed like a melon, from stem

to tip; across its flat surface are stretched five or six pairs of strings, as on the violin, each pair tuned in unison or in octaves. The strings are plucked by the right hand, and the left hand shortens or lengthens the vibrating portion by pressure upon the frets, thus regulating the pitch. The lute is no longer in use. See VIOLIN.

Lu'ther, Martin (1483-1546), the leader of the Protestant Reformation in Germany, born in Eisleben, Saxony. At 14 Luther entered the seminary at Magdeburg, where he often went supperless to bed. He had the same hardships the next year at Eisenach, until one day, while singing in the street for his daily bread, his clear voice attracted the attention of Ursula Cotta, who received him into her home. When he went to the University of Erfurt in 1501, he intended to enter the profession of law; but he was uneasy, and gradually the monastic life seemed to him the only means of saving his soul. The discovery in the university library of a copy of the Vulgate translation of the Bible had much to do with this decision. After two near escapes from death he suddenly announced that he had made up his mind to become a monk, and he sought the Order of St. Augustine in 1505, after taking his master's degree at the university.

Luther became a priest in 1507 and the next year was recommended to Frederick the Wise of Saxony as a professor for his recently founded University of Wittenberg. Receiving an appointment to the chair of philosophy in that institution, his teachings soon began to attract attention. In 1511 he made a journey to Rome. During these years his fundamental doctrine of justification by faith was slowly developing in his mind. He was aroused when in 1517 the monk Tetzel came to preach in the neighborhood, bringing indulgences recently granted by Pope Leo X. Luther then nailed 95 theses in Latin to the church door at Wittenberg, and was soon surprised to learn that these theses had been translated into different languages and were being discussed all over Europe. The Reformation had begun. Pope Leo summoned Luther to Rome, but he declined to go, and a meeting was finally held at Augsburg in 1518 with Cajetan, the papal legate. Luther refused to recant. In 1519 he engaged in a public disputation at Leipsic with the celebrated Dr. Eck, and realized as never before how wide was his separation from the Roman Church.

This debate marks the final rupture of Luther with the papal authority. He now published his three famous treatises: *An Address to the Nobility of the German Nation*; *On the Liberty of a Christian Man*; and *The Babylonian Captivity of the Church*. These writings contain the program of the reformation and explain its fundamental principles. Their immediate impression was remarkable. The unwarranted privileges of the church and the clergy were exposed in these writings, and the deep spiritual meaning of Christianity was shown. A papal bull condemned Luther, but he burned it openly in Wittenberg in 1520. Charles V summoned Luther to the Diet at Worms, which met in April, 1521. Luther boldly went and firmly refused to recant, unless he was proved wrong by the Scriptures. While returning he was taken by Frederick the Wise to Wartburg Castle, where he completed his translation of the New Testament into German. In March, 1522, he was back in Wittenberg, preaching and publishing with his accustomed energy.

The parties that had rallied around Luther against the authority of the Church now broke out into revolt against society and the State. The uprising of the knights under Franz von Sickingen was soon put down and the incompetent leader was killed. The Peasants' War (1524-1525) was a much more serious affair. The poor listened eagerly as Luther declared the equality of men before God, and as he scored the nobles for their injustice. They drew conclusions that Luther never intended, and, aroused by their excesses, he gave way to some of the most violent language that he had ever used. However, Luther later cen-

sured the princes severely for their cruelty and brutality in putting down the revolt. He felt the sufferings of the poor, but he would not be drawn from his religious reforms by the social and political questions that were already beginning to attract the people of Europe. He was impatient of anything that interfered with his religious work, and by his hymns, schools, catechisms and translations of the Bible he deepened the religious and educational side of the Reformation and established its principles permanently among the people.

In his later years he was led into controversy with Henry VIII of England and with the more placid Erasmus. He also broke with his old friend, Carlstadt, and with Zwingli over the doctrine of the Lord's Supper. He was in ill health, but continued his labors as author and organizer. In 1546 death came upon him at Eisleben, as he was on a journey to reconcile members of the Mansfeld family.

Luther possessed keen insight and a practical nature which kept him committed to the main issues. The violence and lack of self-restraint which he sometimes showed in his writings were the natural failings of a courageous, enthusiastic, whole-hearted, determined man. He was deeply religious and responsive to beauty in all of its forms. Seeking for immediate access to God, he found this in his fundamental doctrine of justification by faith, which has become the cardinal tenet of Protestantism.

Lu'therans, the members of those churches which accept the doctrine and polity formulated by Luther and his associates. The name Lutheran was first applied in derision by the opponents of the Protestants, and was not acceptable to Luther, whose original purpose was to secure certain reforms in the Church, not to start a new organization. At the present time many of the inhabitants of Germany are Lutherans; the established churches of Denmark, Sweden and Norway are Lutheran in theology; the Finns and about one-fourth of the Swiss are of this faith; and Lutheran congregations are found in various other parts of the world. In 1530 the Augsburg Confession was presented by the Protestant theologians as the statement of their doctrine, and the Lutheran churches today recognize this Confession as the universal symbol of Lutheranism. The Lutherans emphasize the Scriptures as the inspired word of God and having more weight than reason, tradition or Church decisions. Justification by faith is the central doctrine of their system. There are in the United States about 2,245,000 communicants.

Luxemburg, *Luk' sem burg,* an independent grand duchy of Europe, bounded on the n. and e. by the Prussian Rhine Province, on the south by Lorraine and France, and on the west by Belgium. It has an area of 998 sq. m. and a population (1910) of 259,891. Luxemburg, the chief town, is the capital. The country is rich in iron ore, and contains iron furnaces, tanneries, weaving and glove-making factories, paper mills, breweries and sugar refineries. The government is in the hands of the grand duke, who sanctions and promulgates the laws. There is a council of 15 members and a chamber of deputies of 53 members. The Grand Duchy of Luxemburg was included from 1815 to 1866 in the dissolved Germanic Confederation. By the Treaty of London, 1867, it was declared neutral territory, and its independence and integrity guaranteed.

Lux'or, The Temple of, a great temple built near the site of ancient Thebes by Amenophis III about the year 1500 B. C. It is of sandstone and probably occupies the site of a much older temple. The temple consists of two courts, each surrounded by two rows of columns and connected by a long colonnade. Beyond these are a large hall and three sacred chambers, whose decorations are numerous and interesting. Three of the six colossal statues of Rameses II, carved from single stones of black granite, still stand before the temple. The inclosure, which is nearly 500 ft. long and 180 ft. wide, was connected with the temple at Karnak, over a

mile north of it, by an avenue bordered on either side with ram-headed sphinxes. Until excavations were begun by Maspero in 1883, the entire temple was buried in sand and rubbish. Among the most important relics are two well-preserved granite obelisks which stood before the gateway of the temple; one of these is now in the Place de la Concorde in Paris. See KARNAK, THE TEMPLE OF.

Lycurgus, *Li kur' gis,* a traditional lawgiver of Sparta, said to have lived about 900 B. C. He was the guardian of his nephew Charilaus, who became king in his infancy. When freed from his duties as guardian he is said to have traveled extensively in the East to study the laws and customs of other people. On his return he wrote a constitution for Sparta which was practically unchanged as long as she remained independent (See SPARTA). The main principle of this constitution was that all personal claims or interests should be subservient to those of the State.

Lyd'ia, an ancient country in the west-central part of Asia Minor. The Lydians came into the country about 720 B. C. In 546 B. C. the Lydian ruler, Crœsus, was defeated by Cyrus, and Lydia remained a part of the Persian Empire until the conquest of Alexander, 333 B. C. The Lydians early developed an interior commerce, and are said to have been the first people who coined money. They early came into relation with the Greeks through the Ionian cities. In the time of Crœsus these cities were a part of the Lydian Kingdom.

Ly'ell, Sir Charles (1797-1875), an English geologist, born at Kinnordy, Scotland, and educated at Oxford. He abandoned the study of law to devote his time and fortune to geological research, in pursuit of which he visited the United States and Europe. Generally credited with being the founder of modern geological science, Lyell wrote *Principles of Geology,* later amplified in *Elements of Geology* and *The Antiquity of Man.* In this last work he asserted that the human race was much older than was currently believed.

Lymph, *Limf,* a colorless, watery-looking fluid which nourishes the tissues of the body. The digested food material of the small intestine is absorbed by the lacteals and discharged into an elongated pouch called the *receptaculum chyli,* from which it passes into the thoracic duct and thence into the left subclavian vein. In the blood vessels this liquid is known as plasma (See BLOOD). The thin walls of the capillaries allow the plasma to filter through and irrigate the spaces between the cells of the tissues, supplying them with nourishment. The lymph is then drained off through a system of tubes carrying the waste material thrown off by the cells, and returned to the blood to be renewed. See LACTEALS; LYMPHATICS.

Lymphatics, *Lim fat' iks,* the system of tubes which collect the lymph from the tissues and return it to the blood, and which also absorb the food materials from the intestines and carry them to the blood. The minute tubes lying close to the blood vessels, which gather the lymph from the tissues, are called lymph capillaries. Those of the left side of the body empty their lymph into the thoracic duct, which conveys it to the left subclavian vein; those of the right side discharge their contents into a smaller duct entering the right subclavian vein. The lymphatics of the intestine are called lacteals. They receive the nutrient substances from the intestines and empty them into the *receptaculum chyli,* from which the contents are discharged into the thoracic duct. Throughout the course of the lymphatic vessels are numerous glands, which are abundant in the armpit, under the knee, in the groin, abdomen, thorax and neck. The contents of the lymphatics flow slowly, but are prevented from moving backward by a succession of valves, arranged so close together as to give the tubes a beaded appearance.

Lynch'burg, Va., a city of Campbell Co., in the central part of the state, situated upon the James River and the James River Canal and on the Chesapeake & Ohio, the Norfolk & Western,

the Southern and other railroads. It is 124 m. s.w. of Richmond, in the midst of a beautiful hilly country that at the north is overlooked by the peaks of the Blue Ridge Mountains. Set in the midst of its rounding hills, the city of Lynchburg lacks the monotony of a wholly level situation. The broad streets ascend rolling hills or descend by steep slopes to the river. The private grounds are frequently terraced and are outlined by hedges, shrubs and trees of luxuriant foliage. The park system is extensive, and the areas reserved, though of great natural beauty, have been enhanced by fountains, statuary, well-kept shrubbery and flowers and shaded walks. The business blocks, apartment houses and factories are modern in their appointments, and the residences are especially attractive, being chiefly of the broad Southern style. Among the important public buildings are the new Auditorium, with a fine convention hall, Chamber of Commerce Building, a large Y. M. C. A. Building, a library, several hospitals and many fine churches. An excellent electric-railway system operates throughout the city and leads to suburban points.

The public school system of Lynchburg is housed in commodious and attractive buildings that are provided with laboratories, gymnasiums and large playgrounds. Further, the city is the seat of Virginian Christian College, the Virginian Collegiate and Industrial School for negroes and the celebrated Randolph-Macon Woman's College. Furnished with good water power from the James River, Lynchburg is an important manufacturing city. The boot and shoe industry leads, though established as recently as 1900. Tobacco of excellent quality is grown in the neighborhood, and this becomes the second export in value. Among the other products manufactured in the city are buggies, wagons, notions, hosiery, overalls, shirts, plows and adding machines. The textile mills, woodworking establishments, stone quarries and mines add to the city's commercial importance. The city owns and operates the waterworks.

Lynchburg was settled in 1757 by John Lynch, who owned and settled much of the surrounding land and established a ferry across the river at this point. It became a village in 1786, a town in 1805 and a city in 1852. It was a distributing center for Confederate supplies during the Civil War. It has had a rapid growth since 1900. Population in 1920, 29,956.

Lynch Law, a term derived from the name of Charles Lynch, a patriotic Virginian who, during the Revolutionary period, punished lawless persons in a summary manner, as courts of justice were rare and acts of outlawry not uncommon. Such a course seemed wise in order to protect peaceable citizens in the enjoyment of their rights and privileges. Lynch law is now applied to the capture and killing of self-confessed criminals, or those against whom proof is conclusive, without application to courts of justice.

Lynn, Mass., a city and seaport of Essex Co., 10 m. n.e. of Boston and 5 m. s.e. of Salem, on Massachusetts Bay, 2 m. from the Peninsula of Nahant, and on the Boston & Maine, the Boston, Revere Beach & Lynn and other railroads. Electric suburban lines connect with many near-by towns and cities. The sections of the city are known as East Lynn, West Lynn, Glenmere and Wyoma. The business part of the city is built near the shore on low ground and the residential parts on higher levels. The three-mile shore-line adds to its attractiveness. The scenery is varied and picturesque. The city contains many handsome residences, especially on the shore side. Lynn Woods, a beautiful park, covers more than 2000 acres and is one of the largest pleasure grounds in the country.

Among the principal buildings are the Lynn Hospital, a home for aged women, a public library, a handsome city hall and a soldiers' monument. Lynn is primarily a manufacturing city and is noted for its extensive manufactures of women's and children's shoes. The manufacture of morocco-tanned leather and of electrical appliances are important industries. There are also manufactories of

cut leather, shoe machinery, patent medicines, car equipments, dynamos and shoe findings. The first smelting works in New England were established here in 1643 and the manufacture of boots and shoes was introduced in 1636.

Lynn was settled in 1629 and was called Saugus. The present name was adopted in 1637 in honor of Rev. William Whiting, whose former home was in Lynn Regis, Norfolk, England, and who was pastor at Lynn from 1636 until his death. Lynn received a city charter in 1850. Population in 1920, 99,148.

Lynx, or **Catamount,** a wild and fierce member of the Cat Family, living generally in cold Northern woods in Scandinavia, Russia, Canada and Alaska. In build the lynx is short, with a thick body, long, strong limbs and a short, tufted tail. Its eyes are fierce and said to be very sharp; its ears are pointed and erect. The coat is spotted or clouded and varies from light gray to dark blue-gray or brown. The lynx shows great patience and cunning in hunting and its attack is always made by a spring from ambush, so well calculated that the animal generally alights upon the back of its prey just where its claws and powerful jaws can produce speedy death; if it misses its prey it makes no attempt to pursue but lies in wait for the next. The lynx can go for days without food and endure cold and hardships better than the majority of animals. The Canadian lynx rarely ventures south of the Lake Superior region, but a smaller, more spotted species, called the bobcat, is found as far south as Mexico. Both the bobcat and the lynx, pursued by trappers for their pelts and by pioneers who must keep them driven back from the border line of civilization, are becoming more rare and are seldom seen save in their wild haunts.

Ly'on, Mary Mason (1797-1849), an American educator, founder of Mt. Holyoke Female Seminary, born on a farm near Buckland, Mass., and educated at Sanderson Academy and Byfield Academy. She was one of the founders of a seminary for girls at Ipswich, but in 1834 resigned her position to found Mt. Holyoke Female Seminary at South Hadley, Mass., in which girls of moderate means might find opportunities for a thorough education. The institution was opened in 1837, and at the time of her death she had served nearly 12 years as its principal. Under her wise management the school had attained a high standard and a national reputation; and the influence of her life and her ideals has in a large degree determined the character of higher education for women in America. She wrote *The Missionary Offering* and an account of the seminary.

Lyon, Nathaniel (1818-1861), an American soldier, born in Ashford, Conn., and educated at West Point. He distinguished himself in the war in Florida and against Mexico, in 1851 became captain and at the outbreak of the Civil War commanded the St. Louis arsenal Placed in command of the St. Louis Department, he was instrumental in preserving Missouri to the Union. He attacked a large force at Wilson's Creek, near Springfield, and was killed in battle. He left his entire fortune of $30,000 to the government for carrying on the war.

Lyons, a city of France, the capital of the Department of the Rhône, the third city in the country in population and the second in industrial importance, situated at the confluence of the rivers Rhône and Saône, 218 m. by rail n.w. of Marseilles. There are several bridges spanning the rivers, and the streets are wide and airy. The notable buildings include the celebrated Church of Notre Dame de la Fourvière, the cathedral of St. Jean, begun in 1110, the Hôtel-de-Ville, the Palais des Arts, which has several museums and a library, the Grand Theater and the Exchange. The University of Lyons has an attendance of 2600 students and ranks next to that of Paris. There are also technical and art schools, libraries, hospitals, rich museums and charitable institutions.

The industries include the manufacture of dyes, perfumes, soap, laces and hats. The printing establishments have

long been distinctive. The silk manufactures are very valuable and give employment to large numbers; a large part of the raw silk brought to Europe is prepared in Lyons, and one-half of the prepared silk is exported, the rest being used in local industries. Leather and skins are prepared and the machine shops and ironworks are extensive. The Exchange of Lyons is practically independent of that of Paris, and Lyons is an important financial center. It was formerly the Gallic town of Lugdumum. In 1320 it received a municipal charter. It has suffered from massacres, floods and labor riots, but has enjoyed recent marked prosperity. Population in 1906, 472,114.

Lyons, Gulf of, an arm of the Mediterranean Sea, on the southeastern coast of France. It receives the waters of the Rhône River. Sand bars are an obstruction to navigation. On its shores are the towns, Marseilles, Cette and Toulon.

Lyre, *Lire,* a stringed musical instrument of ancient origin. It consisted of two branching arms extended upward and joined near the top by a crosspiece, from which the strings were stretched to the bottom of the body. The number of strings varied with the shape of the frame. Some instruments had two and some as many as 12 strings. There was no keyboard or other means of changing the tone of the strings. The lyre was in general use among the ancient Egyptians and Greeks, but its origin is unknown.

Lyre Bird, a family of birds inhabiting Australia. Of the three species the common lyre bird is perhaps the best known. It is about the size of a domestic fowl, and its general color is olive-brown, with a reddish tinge on the wings and throat. The peculiarity from which the bird receives its common name is the long tail feathers, which stand erect and resemble in outline an ancient lyre. The two outer tail feathers are the largest and are curled outward at the end. The outer tail feathers are very fine, consisting of the central shaft with a number of fine barbs, which resemble the strings of the lyre. These birds are solitary in habit, a pair usually being seen together. The male possesses a variety of notes, which may be classed as a song of some merit. It is also a good imitator of the sounds made by other birds. The nest is placed on a projecting ledge of rock and is made of large sticks and lined with bark and rootlets. It contains one large, dark-colored egg.

Lysan'der (?-395 B. C.), a Spartan general. He won a decisive victory over the Athenian fleet at Ægospotami in 405 B. C., which was followed by the surrender of Athens. This brought to an end the Peloponnesian War and marked the downfall of Athenian supremacy. In 395 B. C. he was sent as commander of an army against the Bœotians, and was killed in that expedition.

Lys'ias (about 450 B. C.-380 B. C.), a Greek writer, the third of the ten Attic orators. At the age of 15 he went to Thurii in southern Italy, where he studied rhetoric, but in 412 B. C. removed to Athens and engaged in shield manufacturing. Forced to flee during the turbulent reign of the Thirty Tyrants, he escaped to Megara, returning in 403 B. C. He now became a writer of speeches for others to deliver, in which he was very successful. About 34 of his orations are extant. His writings were characterized by purity of diction, brevity, clearness and simplicity.

Lysippus, a Greek sculptor who flourished between 360 and 316 B. C. He was head of the school of Argos and Sicyon and was noted for the number of his works, over 1500. A number of these were of colossal size. His statues differed widely from those of his predecessors in the proportions of men. He made the body more slender and the head smaller, thus conveying the impression of greater height. A number of his statues of the gods were famous, and many of them were colossal figures in bronze. He also made a number of statues of Alexander the Great, in which he idealized his subject, giving such satisfaction that he became sculptor to the King.

Lyte, Henry Francis (1793-1847), an English clergyman and hymn writer,

born near Kelso, England, and educated in Trinity College, Dublin. His first curacy was near Wexford, Ireland. He went to England in 1823 and settled in the Parish of Brixham. He attained a wide reputation through his hymns and other poems, chiefly religious. His best-known hymns are *Abide with me! Fast Falls the Eventide; Jesus, I my Cross Have Taken; Praise my Soul, the King of Heaven;* and *Pleasant are Thy Courts Above.* In 1844 Lyte went to Italy, where he died at Nice three years later.

Lyt'ton, Edward Robert Bulwer (1831-1891), first Earl of Lytton, an English poet and statesman, born in London. As a poet he used the pen name, Owen Meredith. He was the only son of the first Baron Lytton. After studying at Harrow and at Bonn, Germany, he entered the diplomatic service in 1849. In 1876 he was appointed governor-general of India, in which position he remained until 1880, the chief events of his administration being the proclamation of Queen Victoria as Empress of India, the great famine and the Afghan War. In 1887 he was made ambassador to Paris. His verse possessed narrative power and an easy metrical style. Among his works are *Lucile, Glenaveril, Clytemnestra* and *Fables in Song.* He published *Life, Letters and Literary Remains of Edward Bulwer* in 1883.

M

MABIE, *Ma' be,* **Hamilton Wright** (1846-1917), an American essayist, critic and lecturer, born in Cold Spring, N. Y. After graduating at Williams College and at the law school of Columbia University (New York), he became associate editor of *The Outlook,* formerly the *Christian Union.* His keen appreciation of literature and his close touch with nature and spiritual life have been widely disseminated by means of the extensive lecture work which he has carried on throughout the United States. He has revealed an interest in appreciation and interpretation of literature, rather than in scholarship. His writings include *Nature in New England, My Study Fire, Essays in Literary Interpretation, Essays on Books and Culture, Fairy Tales Every Child Should Know, The Great Word, Christmas Today, Introduction to Notable Poems* and *Norse Stories, Retold from the Eddas.*

McAl'ester, Okla., a city and the county seat of Pittsburg Co., about 85 m. s.w. of Fort Smith, Ark., and about 110 m. s.e. of Guthrie, on the Chicago, Rock Island & Pacific, the Missouri, Kansas & Texas and other railways. An electric trolley line connects it with places in the vicinity. There are rich iron and coal deposits near by, and coke making is an important industry. The industrial plants include iron foundries, cotton gins and compresses, a flour mill and brick plants. In the city is a fine Scottish Rite Masons' consistory and temple. The first settlement in the vicinity was made in 1885. South McAlester, as the place was then called, was incorporated in 1899; seven years later the adjoining town of McAlester was annexed and its name adopted for the new city. Population in 1920, 12,095.

Macaroni, *Mak" a ro' ny,* a nutritious food made from the best quality hard-wheat flour. The flour is first mixed into a dough, which is placed in a cylinder with a perforated base. A plunger forces the dough out through the holes in the base, forming the macaroni sticks, which are cut into lengths of ten feet and dried. Smaller sticks are called vermicelli or spaghetti. Macaroni is manufactured in large quantities in Italy and to a considerable extent in France and the United States. Under modern methods the work is done almost entirely by machinery.

MacArthur, *Mak Ar' thur,* **Arthur** (1845-1912), an American general, born in Massachusetts. He began his military career as a soldier in the Civil War in 1862. Four years later he received a first lieutenant's commission in the regular army and a little later was made infantry captain. He served in the war with Spain, rising to the rank of brigadier-general of volunteers in 1898, and very soon to that of major-general, commanding the second division stationed at Havana. He went to the Philippines in 1899, where he ultimately became military governor. He was made major-general in the regular army in 1901, and five years later lieutenant-general, retiring in 1909.

Macaulay, *Ma kol' y,* **Thomas Babington,** Lord Macaulay (1800-1859), an English historian, essayist and statesman, born at Rothley Temple, Leicestershire. He was a precocious child, reading at the age of three and writing a *Compendium of Universal History* at seven and several poems and ballads before he was 12. At Cambridge he won distinction as a debater and a scholar; in literature he leaped into sudden fame by his brilliant and eloquent, though crude, essay on Milton, which was published in the *Edinburgh Review* in 1825. He took little interest in law—he was admitted to the bar in 1826—but in Par-

liament he soon became one of the most prominent members of the Whig Party. An ardent supporter of the Reform Bill, his speeches were delivered with consummate skill and his contemporaries recognized him as an orator of the highest ability. Living in one of the most exciting periods of English domestic history, he found opportunity to exercise wide and permanent influence during the long years of public service which followed. He was in India for four years as legal adviser to the Supreme Council, returned to England in 1838 and was twice again in Parliament and once in the cabinet. In 1846 he was appointed paymaster-general, and lost his seat in Parliament the following year because he was too zealous an advocate of religious toleration. He was elected lord rector of the University of Glasgow in 1849, and was honored with the title of Baron in 1857.

During his active political life and the period of comparative quiet and retirement that followed his refusal of the professorship of modern history at Cambridge, Macaulay devoted himself with great fervor to writing. His ballads, the *Lays of Ancient Rome,* published in 1842, were soon followed by a series of essays on men prominent in literature, a group of biographies and appreciations, keen, lively and concrete. A greater work, however, was his *History of England from the Accession of James the Second.* The sale of the volumes was enormous. There were faults of inaccuracy and partiality in the work, but so brilliant and detailed a historical narrative, such admirable scholarship and such unreserved interest in an age that had passed, had yet not been attained among English men of letters. His style was vigorous, conservative, clear and forceful, revealing the thinking of a man of exceptional talent. He cared little for science or philosophy but substituted instead the practical insight that comes of an intimate knowledge of public affairs, and his abundant use of illustrations revealed a marvelous and prodigious memory.

Macaw, *Ma kaw',* a name applied to certain parrots inhabiting South America. They are mostly large birds with long tails and large, heavy bills, the upper mandible of which is much longer than the lower. They are usually gaudy of color. The largest species is the blue and yellow macaw, which is nearly three feet in length, and is blue above, yellowish-orange below and olive-green on the sides of the neck and the forehead. The tail and wings are blue above and olive-yellow or golden below. This species, known by its incessant screeching, is native from Panama south to Bolivia.

The green macaw may be known by its green plumage, with a scarlet spot on the forehead and a blue patch on the wings, tail, back and rump. Both species are familiar in zoological gardens. About 20 species of macaws are known.

Maccabees, *Mak' a beez,* the name given a prominent Jewish family flourishing 167-37 B. C. The surname Maccabæus belongs properly only to Judas, the most important member of the family, but has been applied to the other members. The Maccabees first came into prominence when the ruler of Syria, Antiochus Epiphanes (175-164 B. C.), attempted to force the Jews into idolatry. The aged priest Mattathias and his five sons—Jochanan, Simon, Judas, Eleazar and Jonathan—at once set up a revolt. Upon the death of Mattathias, 166 B. C., Judas headed the forces of rebellion, defeating four Syrian armies in succession. In 165 B. C. he restored Jewish worship at the Temple, and was endeavoring to achieve political independence for the Jews when he was killed in battle, 161 B. C. The leadership now fell to Jonathan, who became the acknowledged civil, military and religious head of Judea. In 143 B. C. he was treacherously murdered and was succeeded by his brother Simon. The latter secured complete independence for the Jews in 142 B. C., and the following year was made high priest and civil and military head of the Jews. In 135 B. C. Simon was murdered and was succeeded by his son Hyrcanus. Jewish independence came to an end with the

capture of Jerusalem by Pompey, in 63 B. C., and the Maccabæan line became extinct in 37 B. C.

Maccabees, Knights of the, a fraternal order organized in 1883, and now represented by a membership of 375,575, with headquarters at Port Huron, Mich. Over $250,000 has been paid as benefits in cases of illness and death. The Ladies of the Maccabees is an affiliated order.

MacCarthy, *Ma Kar' thy,* **Hamilton** (1847-), a celebrated sculptor, born in London, England, and educated there and on the Continent. Having exhibited at the Royal Academy, London, and having executed commissions for Queen Victoria, the King of the Belgians and the Corporation of the City of London, he came to Canada in 1885. His work there included a public monument to Sir John A. Macdonald in Queen's Park, Toronto; a collaboration with Hébert for the monument to Mackenzie on Parliament Hill, Ottawa; various bronze memorials to the South African heroes; and monuments to De Monts and Champlain. Moreover, he modeled many portrait busts for the Educational Museum in Toronto, designed the bronze group of Burns and Highland Mary in Victoria, and made the coat of arms at the entrance of the Ottawa Mint. Mr. MacCarthy has lectured on art in Canada and Great Britain and has written some admirable verse.

McCarthy, Justin (1830-1912), a British author, born at Cork, Ireland. In 1853 he was on the staff of the *Northern Daily Times,* Liverpool, and 11 years later was editor-in-chief of the London *Morning Star.* He visited the United States from 1864 to 1867, contributing to magazines and doing some work in connection with the New York *Independent.* Returning to England, he accepted a position on the staff of the *Daily News.* He became a member of the House of Commons in 1879, but continued his literary work. He wrote several novels, among which are *Paul Massie, The Waterdale Neighbours, Roland Oliver* and *Maid of Athens.* His historical and biographical works are *History of Our Own Times, A History of the Four Georges, Epoch of Reform, Life of Sir Robert Peel, Life of Pope Leo XIII, Modern Leaders, Reminiscences* and *The Story of Mr. Gladstone's Life.*

McClel'lan, George Brinton (1826-1885), an American soldier, born in Philadelphia and educated at West Point. He took part in the Mexican War and for gallantry at Contreras, Churubusco and Chapultepec was brevetted lieutenant and captain. Later he was instructor in bayonet exercise at West Point, where his *Manual,* translated from the French, became the textbook, and he explored and surveyed the Red River, the harbors of Texas and the western part of a proposed Pacific railway route, with a direct route to Puget Sound. In 1855 he served on the commission which studied the organization of European armies and watched the Crimean War. Subsequently he engaged in civil engineering and was identified with a number of railroad enterprises. At the outbreak of the Civil War he was commissioned major-general of Ohio volunteers, after the first engagement of Bull Run succeeded McDowell, in command of the Army of the Potomac, and in November, 1861, on the retirement of General Scott, became commander-in-chief of the United States armies. In this capacity he successfully organized the raw recruits; but his campaign against Richmond in the spring of 1862, with the Army of the Potomac, was a failure, and in consequence he was removed as commander-in-chief. He later, by battles at South Mountain and Antietam, drove Lee out of Maryland; but his dilatoriness in following up this victory caused dissatisfaction at Washington, and, upon being superseded by Burnside, McClellan resigned from the army on Nov. 8, 1864. He was the unsuccessful presidential candidate against Lincoln in 1864, and in 1877 he was elected governor of New Jersey.

McCler'nand, John Alexander (1812-1900), an American soldier, born in Breckenridge County, Ky. He was early taken to southern Illinois, where in 1832 he was admitted to the bar. He saw

service in the Black Hawk War, and was editor of the Shawneetown (Ill.) *Democrat.* At the outbreak of the Civil War he was appointed brigadier-general and distinguished himself at Belmont and Ft. Donelson. As major-general of volunteers he was division commander at Shiloh, and in January, 1863, he succeeded General Sherman in command of the army engaged in the Vicksburg campaign, holding this position until superseded by General Grant.

McClos'key, John (1810-1885), an American Roman Catholic cardinal, born in Brooklyn and educated at Mount St. Mary's College, Emmitsburg, Md., and in Rome and France. After his ordination to the priesthood in 1834 he was, successively, pastor of St. Joseph's Church, New York, president of St. John's College, Fordham, N. Y., coadjutor to Bishop Hughes of New York and, in 1847, Bishop of the new Diocese of Albany. His administration of this see was made notable by the erection of the cathedral at Albany, the founding of the school of theology at Troy, and the establishment of various charitable and religious institutions. Having succeeded Archbishop Hughes of New York in 1864, Father McCloskey was appointed a cardinal in 1875. A deep scholar, able administrator and effective preacher, he was also a man of earnest piety.

McClure, Samuel Sidney (1857-), an American editor, born in Antrim County, Ireland. He was educated at Knox College. In 1884 he established a newspaper syndicate, and in 1893 he became president of S. S. McClure Company and founded and became editor of *McClure's Magazine.*

McCook, Alexander McDowell (1831-1903), an American soldier, born in Columbiana County, Ohio, and educated at West Point. He was colonel of the First Ohio Regiment at Bull Run, and in July, 1862, having distinguished himself at Shiloh and Corinth, became major-general of volunteers. He was corps commander at Perryville, commanded the right wing at Murfreesboro and was conspicuous at Chickamauga. In April, 1895, he was retired with the full rank of major-general.

McCor'mick, Cyrus Hall (1809-1884), an American inventor, born in Walnut Grove, in what is now West Virginia. He was the inventor of the McCormick harvester, first introduced in 1831, and continuously improved. In 1847 McCormick moved to Chicago and engaged in the manufacture of his machines. He amassed a large fortune, endowed a chair in Washington and Lee University at Lexington, Va., and established McCormick Theological Seminary at Chicago, under the management of the Presbyterian denomination. He and his heirs have given more than $1,000,000 to this institution. See REAPING MACHINE.

McCosh, *Ma Kosh',* **James** (1811-1894), an eminent Scotch-American educator, born in Ayrshire, and educated in the universities of Glasgow and Edinburgh. He won fame as a philosophical thinker by publishing in 1850 *The Method of the Divine Government, Physical and Moral.* For the next 18 years he was professor of logic and metaphysics in Queen's College, Belfast, and from 1868 to 1888, president of the College of New Jersey (now Princeton University). During these 20 years the endowment was largely increased, the institution was put upon a university basis and the number of professors and students was doubled. Until his death, Dr. McCosh continued to serve as a lecturer in philosophy. Among his works are *The Emotions, The Supernatural in Relation to the Natural* and *Psychology of the Motive Powers.*

McCrea, *M'Kra,* **James** (1848-1913), an American railway president, born in Philadelphia and educated at the Pennsylvania Polytechnic College. Upon graduation he entered the railroad service as a rodman, and worked in this capacity and as assistant engineer for the Connellsville & Southern Pennsylvania Railroad until 1867. His promotion was rapid and steady through the successive positions of manager, division superintendent, general manager and fourth vice-president of the Pennsylvania lines

until he became the president, in 1907. Under his administration the road planned and carried out the construction of the great tunnels under the Hudson River and of the magnificent terminal station in the heart of the metropolitan district of New York City. Mr. McCrea was also president of the Pittsburgh, Cincinnati, Chicago & St. Louis, the Philadelphia, Baltimore & Washington, the Northern Central and the West Jersey & Seashore railroads. He was considered one of the able railway builders of the country.

McCulloch, *Ma Kul' uk,* **Hugh** (1808-1895), a secretary of the United States treasury, born in Maine. He attended Bowdoin College, studied law, and began practice in Fort Wayne, Ind. Later he entered the banking business there. In 1863 he accepted the newly-created office of national comptroller of the currency; and in 1865 was appointed secretary of the treasury by President Lincoln, holding office throughout Johnson's administration. He rendered great service to the nation in providing for the enormous obligations of the government at the close of the war and in funding the public debt. In 1884-85 he was again secretary of the treasury.

McCut'cheon, George Barr (1866-), an American novelist, born in Indiana and educated at Purdue University. In 1889 he entered upon a journalistic career, becoming reporter for the Lafayette *Journal,* and, later, city editor of the Lafayette *Courier.* Since 1901 he has been writing popular fiction, including novels and short stories for various magazines. His writings show originality, and his plots are often unusual. Among his novels are *Graustark, Brewster's Millions, Beverly of Graustark, Nedra, Jane Cable, The Rose in the Ring* and *Her Weight in Gold.*

McCutcheon, John Tinney (1870-), an American cartoonist and special news correspondent, born in Tippecanoe County, Ind. Mr. McCutcheon graduated from Purdue University in 1889. In 1896 he became correspondent of the Chicago *Record,* and his cartoons immediately attracted wide attention. Still acting as correspondent he made a tour of the world in a dispatch boat, being of special service in Korea, Japan, Siam, China, Burma and India. During the Spanish-American War he accompanied a military expedition to the Philippines. He also joined the Boers of South Africa in the interests of his paper. In 1900 he furnished the political cartoons for the *Record-Herald,* Chicago, and later became cartoonist for the Chicago *Tribune.* He is author of *Stories of Filipino Warfare* and *Cartoons by McCutcheon.*

Macdonald, *Mak don' ald,* **George** (1824-1905), a Scottish novelist, born at Huntley, Aberdeenshire, and educated at Aberdeen University. After studying for the ministry at the Independent College, London, he began preaching, later retiring on account of ill health. His first publications were volumes of verse; these were followed by several novels, which, though not well constructed, have a high moral tone and are of considerable interest. Macdonald visited the United States in 1872-73 on a lecturing tour. Among his writings are *The Gifts of the Child Christ and Other Poems, Robert Falconer, Wilfrid Cumbermede, Malcolm, Lilith, At the Back of the North Wind* and *Unspoken Sermons.*

Macdonald, James Alexander (1862-), a Canadian journalist, born in Ontario, and educated in Edinburgh University and Knox College, Toronto. He was Presbyterian pastor of Knox Church, St. Thomas, Ontario, from 1891 to 1896, when he became editor of *The Westminster* and, subsequently, of the *Canadian Presbyterian.* In 1902 he became chief editor of the Toronto *Daily Globe.* Dr. Macdonald is known throughout Canada and the United States as a public speaker, his repertoire including *The Place of Canada Among the Nations, The Significance of Lincoln* and *America's Part in the Peace of the World.* He has, moreover, distinguished himself as a press and magazine writer. In 1911 he became director of the World's Peace Foundation.

Macdonald, Sir John Alexander (1815-1891), a Canadian statesman and first premier of the Dominion, born in Glasgow, Scotland. When he was a child, his parents came to Canada and settled in Kingston, Ontario. Macdonald began the study of law at 15 years of age, and was admitted to the bar when he was 21. The next year the rebellion in Canada broke out, and the years immediately following were full of events well calculated to stimulate political thought. Macdonald's first public office was that of alderman in Kingston. In 1844 he was elected to the Legislature of Ontario as a Conservative, and from this time on his influence and power in public affairs continued to increase. He was successively a member of the Executive Council, receiver-general, commissioner of public lands, attorney-general, minister of militia and minister of justice.

From the beginning of his public career, Macdonald saw clearly that the prosperity of Canada depended upon the union of the various provinces under a general government, and a close affiliation of that government with the Government of Great Britain, and he gave much of his time and energy to securing these ends. He was the leader in securing the formation of the Confederation and naturally became the first prime minister of the Dominion. In this position he was confronted by many intricate and perplexing problems, but such was his ability in administrative affairs that the leaders of all opposing forces looked to him to harmonize the various conflicting interests. This he did during his first term. In 1874 the Liberal Party came into power, but in 1878 the Conservatives returned and Sir John was again made premier, which position he held the remainder of his life.

He was the leading spirit in the construction of the Intercolonial and the Canadian Pacific railways, each among the largest railway projects ever undertaken. His guiding hand also shaped much of the legislation which bound the provinces together into a nation and which laid the foundation for Canada's growth and prosperity. A man of unusual sagacity, power and determination, Macdonald was one of the leading statesmen of his time, not only in Canada but in all the British Empire. His statue adorns public parks in many Canadian towns and cities, and he has a memorial in St. Paul's, London.

Macdonough, *Mak don' o,* **Thomas** (1783-1825), an American naval officer, born in Delaware. In 1800 he entered the navy as midshipman, later serving against the Barbary States, and in the early War of 1812 was lieutenant on the *Constitution,* being commissioned to build a fleet on Lake Champlain, September, 1812. For his victory over a British fleet under Captain Downie, at Plattsburg, Sept. 11, 1814, he was made captain and awarded a gold medal. He died at sea. McMaster declared Macdonough the greatest American naval commander before the Civil War.

McDougall, *Mak Doo' gal,* **John** (1842-), a Canadian missionary and author, born in Ontario and educated at Victoria University. Raised among the Indians of Georgian Bay and Lake Superior, he spoke Indian before he learned English. In 1860 he moved to the North West Territories, where he successively taught school, was an interpreter, and entered the Methodist ministry, thereafter spending many years among the Indians. He has written and lectured extensively on topics pertaining to frontier life and the Western Indians.

McDow'ell, Irvin (1818-1885), an American soldier, born at Columbus, Ohio, and educated at a military school in France and at West Point. In May, 1861, he became brigadier-general of volunteers, with command of the Army of the Potomac. Following his defeat at the first Battle of Bull Run, he was relieved of command by McClellan, under whom he became corps commander and defended Washington. In April, 1862, when McDowell was a major-general of volunteers, his corps was detached from the Army of the Potomac and he was

given charge of the Department of the Rappahannock. He was prominent at Cedar Mountain and Bull Run. Early in 1865 he was brevetted major-general for action at Cedar Mountain, in 1872 he became full major-general, and, having been in command of the departments of the East, of the South and of the Pacific, he retired in 1882.

Mace, *Mase,* an aromatic spice made from the membranous covering of the nutmeg. When the fruit ripens, the tough, leathery skin parts at the top, disclosing the nut surrounded by a scarlet membrane. This coat, when dried and powdered, forms the mace of commerce used for culinary purposes where foods are to be highly spiced. Mace is prepared wherever nutmeg trees are grown; namely, Java, Sumatra, Ceylon, China and the West Indies. See NUTMEG.

Mace, a weapon of war formerly in use in Europe, chiefly among the cavalry as late as the 16th century. It consists merely of a staff about five feet long with a knob at the end made of iron or other heavy substance. It is used as an emblem of authority. In the English House of Parliament it occupies a prominent position during every session but is rarely seen in the United States Congress. The only occasions on which it appears is when members forget decorum and engage in controversies or personal encounters beyond the control of the presiding officer. At such times the sergeant at arms carries it in full view of all members, where its presence commands peace.

Macedonia, *Mas" e do' ni a,* an ancient country of southeastern Europe, north of Thessaly. The real importance of Macedonia in history began with Philip (382-336 B. C.). He found the people a loose union of tribes, which he consolidated into a strong kingdom. By shrewd diplomacy and by war Philip gained the Thracian cities of Athens and drew enormous revenues from the gold mines which he developed. By 348 B. C. every Greek city on the Macedonian coast had fallen before him. By 338 he was master of Greece.

Under Alexander the kingdom was greatly enlarged (See ALEXANDER THE GREAT). In 146 B. C. Macedonia became a Roman province and it was a part of the Eastern Empire in 395 A. D. In the 14th century it came under Turkish rule, remaining a part of the Turkish Empire until 1913, when it was divided among Servia, Bulgaria and Greece.

McGill College and University, at Montreal, Canada, was founded in 1821 by Hon. James McGill, who left an estate of about $120,000 for the purpose, with the provision that one of the colleges should always be known as McGill College. Through the generosity of others, additional schools have been established from time to time. The university library and Peter Redpath Museums were gifts of Peter Redpath. The university maintains faculties of art, law, medicine and science, and there are four affiliated theological schools. The degrees in the faculty of arts are open to both men and women. McGill is affiliated with the universities of Oxford, Cambridge and Dublin, with the University of Toronto and a number of other colleges and universities of Canada. The government is in the hands of a board of governors, 15 in number. The governor-general of Canada, as representative of the Crown, exercises supreme authority. The president of the board of governors is ex-officio chancellor. The executive head of the university, however, is the vice-chancellor, who is styled principal. The university occupies a beautiful site in Montreal, has property valued at about $2,500,000 and an enrollment of over 1200.

Machiavelli, *Mah" kyah vel' le,* **Niccolò** (1469-1527), an Italian statesman and man of letters, born at Florence. After securing a liberal education, he entered public life in 1494 when the Medici were expelled from Florence. In 1498 he became secretary of the Board of Ten, which exercised the civil and military powers of the Florentine Republic established by Savonarola. For 14 years he occupied this position and helped to guide the destinies of his coun-

try. When the Medici returned to power in 1512, Machiavelli retired to his country house, and the remaining years of his life were devoted to writing, chiefly on political subjects. He was a keen observer of men and a true patriot, with a burning desire for the welfare of Italy. His most noted writing, *The Prince,* advocates the political policy expressed in the adage, "The end justifies the means," which has come to be known as "Machiavellianism." He also wrote valuable reports upon his diplomatic missions and upon foreign affairs, a *History of Florence* and *Discourses upon the First Ten Books of Livy.*

Machine, *Ma sheen',* **Gun,** a gun in which loading, firing and extracting the empty shell are performed by machinery. These guns use the same cartridge as the infantry rifle, are worked by one or two men and can fire 20 shots per second. They are, therefore, very useful to supplement a deficient infantry fire. These guns can be fired from carriages, parapet mountings or tripods, can be carried either on carriages or pack animals, and are particularly serviceable for accompanying cavalry. There are two classes of machine guns, those operated by hand and those operated by utilizing the gases from the burnt powder. The Gatling and Gardner guns belong to the former class; the Colt, Hotchkiss, Yamanouchi, Maxim-Nordenfeldt and Dawson-Silverman, to the latter. During the World War they were used on an enormous scale. The Browning gun used by the American Army is claimed to be the most efficient. See ARMY; GATLING GUN.

Machines, Simple, known also as the mechanical powers, the fundamental devices by which the amount or mode of application of a force is changed for the purpose of gaining some practical advantage. They are the lever, the rope and pulley, the wheel and axle, the inclined plane and the screw, each of which is described under its title.

McIlwraith, *Mak' Il rathe,* **Jean Newton,** a Canadian author, known as Jean Forsyth, born in Ontario and educated in Hamilton Ladies' College. Her first story appeared in *Harper's Bazaar* in 1890, and four years later she appeared in *Harper's Magazine,* having since contributed to such periodicals as the *Cornhill* and *Atlantic Monthly.* Her later works include *A Book about Shakespeare, Canada* in the Children's Study series, *A Book about Longfellow* and *The Life of Governor-General Sir Frederick Haldimand* in The Makers of Canada series.

Mackay, *Ma ki',* **John William** (1831-1902), an American capitalist, born in Dublin, Ireland. Early removing to New York, after 1851 he worked in mines in California and Nevada, where in 1872 he discovered the Bonanza mines, of which he owned two-fifths. He was founder and president of the Nevada Bank of San Francisco, and in 1844, with James Gordon Bennett, founded the Commercial Cable Company and Postal Telegraph Company. Subsequently he was interested in laying the American Pacific cable (See CABLE, SUBMARINE). He died in London.

McKees'port, Pa., a city of Allegheny Co., 14 m. s.e. of Pittsburgh, at the junction of the Monongahela and Youghiogheny rivers, and on the Pennsylvania, the Baltimore & Ohio, the New York Central and the Western Maryland railroads. Eight modern bridges span the rivers and a number of electric lines connect the city with the adjoining borough of Glassport and with Duquesne across the Monongahela River. There is also excellent electric service to Pittsburgh, Homestead, Braddock, and other towns and cities of the thickly populated district. McKeesport covers an area of over 13 sq. m. and is situated in the beautiful Monongahela Valley, in the heart of the bituminous coal and natural-gas regions of the state, and is the seat of a vast iron and steel industry. There is also an important trade in coal and lumber. The city contains many miles of well-paved streets, many beautiful residences and a number of public parks, Olympia Park being the largest.

The public buildings include a Federal Building, city hall, numerous banks, a

Y. M. C. A. and a Carnegie library. There are about 45 churches. The educational institutions include a high school, public and parish schools, and Douglass Business and Duff's Commercial colleges. The McKeesport Hospital is a well-equipped institution. McKeesport has an important position among the industrial cities and is noted for its extensive output of iron and steel. The city contains one of the largest tube and pipe works in the world. There are also extensive blast furnaces, tin-plate works, rolling mills, foundries and machine shops, sewer-pipe works, glass factories, artificial-ice plants, planing mills, boat and barge yards, carriage and wagon factories, ax and tool works, fire-brick plants, candy factories and manufactories of flavoring extracts, medicine, women's garments, water and gas meters, spikes and rivets, brass fittings, lacquered ware, coke and coal-tar products, wire articles and carbonated waters. The city formerly contained a distillery and several breweries. There is a large river tonnage.

The first white settler was David McKee, a pioneer from Scotland. In 1769 the colonial government granted him a charter to operate a ferry over the rivers at their confluence. His son, John McKee, founded the town in 1795 and named the place McKeesport in honor of his father. Coal was discovered in 1830. On July 28, 1898, parts of Versailles Township were annexed, and in 1890 the borough of McKeesport was chartered as a city. Population in 1920, 45,975.

McKees' Rocks, Pa., a city of Allegheny Co., 5 m. s.e. of Pittsburgh, on the Ohio River and on the Pittsburgh, Chartiers & Youghiogheny and the Pittsburgh & Lake Erie railroads. The town was settled by John McKee in 1830 and incorporated as a borough in 1892. It has important steel and iron works, car shops, lumber and flour mills, glassworks, etc. McKees Rocks borough is now a part of Stowe Township, which was annexed in 1907. An ancient Indian mound is one of the interesting features of the place. Population in 1910, 14,702. In 1920, 16,713.

McKen'na, Joseph (1843-), an American jurist and statesman, born at Philadelphia, Pa. His father moved his family to California when Joseph was 12 years old. He studied in the public schools, and at the college of St. Augustine, finally taking a law course and beginning to practice at the age of 22 years. He became county attorney, then went to the State Legislature, and in 1884 was elected to Congress, serving four terms, until 1892, when he was made a judge of the United States Circuit Court. He was appointed attorney-general in McKinley's cabinet in 1897. In 1898 he became a justice of the United States Supreme Court.

Mackenzie, *Ma ken' ze,* **Alexander** (1822-1892), a Canadian statesman, born in Perthshire, Scotland. He moved to Kingston, Canada, when he was 20 years of age. He was a stone mason and began in Canada as a builder and contractor, continuing in this business until he became a member of the Parliament of Ontario in 1861. Nine years before this, however, he began editing a Liberal newspaper. He entered the Dominion Parliament in 1867 and became a Liberal leader. From 1873 to 1878 he was premier, and he was a member of Parliament until his death. He declined the honor of knighthood three times. Makenzie was a gifted orator and a wise statesman whose influence is still felt.

Mackenzie, Sir Alexander (1755-1820), an explorer, born in Inverness, Scotland. He emigrated to Canada in 1775, later entering the service of the Northwest Company. In 1789 he set out from Ft. Chippewyan, exploring to its mouth the river bearing his name. On a second exploring expedition, undertaken three years later, he ascended the Peace River, and, crossing the Rocky Mountains, followed the Fraser for a time, made for the Pacific Ocean by an overland route. In 1802 he was knighted and in the same year was published his *Voyages,* the record of his explorations.

Mackenzie, Sir Morell (1837-1892), an English physician, born in Leyton-

stone, Essex. He was educated in London, Paris and Budapest. From 1860 to 1874 he was connected with the London Hospital, and in 1863 he founded the London Throat Hospital. Operative skill in his specialty soon made him famous, and, following his attendance on the German Emperor Frederick III, who was attacked with cancer of the throat, he was knighted by Queen Victoria and honored by Germany. He wrote widely on his chosen subject.

Mackenzie, Sir William (1849-), a Canadian capitalist, born in Ontario. He early constructed part of what is now the Midland Division of the Grand Trunk Railway, and a portion of the Mountain Division of the Canadian Pacific, in 1886 entering into partnership with Sir Donald Mann. He has since constructed over 3000 miles of railroad in the Northwest, recently bought by the government, besides 2000 miles in eastern Canada. Sir William is also owner of the Royal Line of Ocean Steamships and has many other business connections, which cause him to rank among the 23 men at the financial basis of Canada. On Jan. 1, 1911, he was knighted by King George.

Mackenzie, William Lyon (1795-1861), a Canadian statesman, born in Scotland. In 1820 he moved to Upper Canada and made his home at Toronto. In 1824, he founded a paper called the *Colonial Advocate,* in which he freely opposed certain governmental measures. He was elected several times to the Legislature of Upper Canada, but was refused a seat because of his attitude toward the government. He was a delegate to England in 1832 to secure the redress of certain wrongs and to advocate reforms, in both of which he was successful. After his return from England he was for three years mayor of Toronto. During this time he organized an insurrection which broke out in 1837. He was defeated by the Canadian troops and took refuge in the United States, where he endeavored to raise an army to invade Canada. The United States Government stopped the movement. Mackenzie then took up newspaper work in New York City, until the Canadian amnesty of 1849, when he returned to Toronto. He was again elected to the Legislature, serving from 1850 to 1858.

Mackenzie River, a river of northwestern Canada, rising in Great Slave Lake in southern North West Territories. With the Athabaska River, which empties into Lake Athabaska, and the Great Slave River, which connects Lake Athabaska and Great Slave Lake, this forms one of the great river systems of the continent. From the last-named lake the Mackenzie flows northwest, entering Mackenzie Bay, an arm of the Arctic Ocean, by means of a long estuary. The river is wide and has a gentle current uninterrupted by falls or obstructions for fully 1100 m.; its total length is about 2300 m. The northern part of its course is covered with ice fully nine months of the year. See ATHABASKA RIVER; ATHABASKA, LAKE.

Mack'erel, a family of important food fishes highly prized in America. Members of this family are found in great schools upon the New England coasts and in the Gulf of Mexico, where the uncertainty of their appearance gives a tinge of chance, making their capture a sport as well as an industry. Mackerel are slender fish with tapering bodies of graceful form and clean build. They are easily recognized by their forked caudal fin, two short, widely separated dorsal fins and numerous tiny, distinct fins, both dorsal and ventral, just before the caudal fin. In color mackerel are a beautiful combination of blue, black and silver. The average weight is from one and a half to two pounds.

Thousands of people in the New England States depend for their livelihood upon the mackerel catch, and in the United States this fish, whether fresh or salted, has ready sale. Mackerel schooners are among the trimmest of American fishing boats, and their catch is ordinarily the largest taken. European and Asiatic mackerel are coarser fish and not valued as food, though some species produce a useful oil. See FISHERIES.

McKim', Charles Follen (1847-1909), an American architect, born in Chester County, Pa., and educated at Harvard University and in Paris. He became a partner of W. R. Mead and Stanford White. Among his notable designs are those for the Boston Public Library, the library of Columbia University, the New York Century, Metropolitan and University clubs, and the Agricultural Building at the World's Fair held in Chicago in 1893. In conjunction with D. H. Burnham and F. L. Olmsted, Jr., he worked out the remarkable plan for the improvement of Washington, D. C., and also aided in the design of the Madison Square Garden, Washington Arch and Hall of Fame of New York University (all in New York City). His work everywhere shows a refined taste and a highly developed sense of decorative effects.

Mackinac, *Mak' i nak,* **Island,** a small island at the northwest extremity of Lake Huron, 260 m. n.w. of Detroit and 320 m. n. of Chicago. The island is about three miles long and two miles wide and most of it is densely wooded. The south and east sides present high limestone bluffs to the lake. In some places these are worn into fantastic forms. The entire island is noted for the charm of its scenery and is under the control of the State of Michigan as a state park. The village, which is on the south side of the islands, has fewer than 700 permanent residents, but its beautiful scenery and invigorating climate make it a popular summer resort, and during July and August the population is from 10,000 to 12,000. Ft. Mackinac occupies the bluff above the village, and in the government park below the fort is a heroic statue in bronze of Father Marquette.

McKin'ley, William (1843-1901), twenty-fifth president of the United States, born at Niles, Ohio. After a preparatory education he entered Allegheny College in Pennsylvania, but discontinued his studies after a year on account of ill health. He then taught school for a short time. In 1861 he enlisted in the Union army and served throughout the war, with especial gallantry at Antietam, Fisher's Hill and Cedar Creek, leaving the army with the rank of brevet-major. After the war he attended the Albany Law School, and was admitted to the bar in 1867, beginning practice at Canton, Ohio, which he thenceforth made his home.

He soon became interested in politics and gained prominence as a campaign speaker. In 1869 he became prosecuting attorney of the county. In 1876 he was elected to Congress on the Republican ticket, where he served until 1891, except for one term. In Congress he was an advocate of the high tariff, and, as chairman of the ways and means committee, framed the tariff law of 1890 which bears his name.

In 1891 McKinley was elected governor of Ohio, and was reelected in 1893. His administration was so satisfactory that he was nominated for the presidency of the United States by the Republican Party in 1896, and elected by both a popular and electoral majority over William Jennings Bryan, the Democratic nominee. In 1900 he was reelected over Bryan by a still larger majority. His administration was notable for the Spanish-American War, resulting in the independence of Cuba, and for the policy of territorial expansion, including the acquisition of the Philippines, Porto Rico and Hawaii. He was also an advocate of commercial expansion through reciprocity treaties with foreign nations.

In September, 1901, McKinley was assassinated at Buffalo, N. Y., where he had gone to deliver an address at the Pan-American Exposition. The remains were taken to Canton, Ohio, and a fitting monument has there been erected to his memory. For five minutes at the hour of his interment all business ceased throughout the country, and remarkable expressions of respect and sympathy were received from foreign countries. McKinley was universally esteemed for the purity of his life, his high ideals and his generous courtesy. As a statesman he was noted for his remarkably close touch with popular sentiment. Consult Peck's *Twenty Years of the Republic.*

McKinley, Mount, the highest mountain in North America, is situated in the south-central part of Alaska in the Alaskan Range. Its altitude is 20,464 ft. The summit is covered with snow, and there are extensive glaciers on the slopes.

Mack'intosh, Charles Herbert (1843-), a Canadian journalist, born in Ontario. He entered newspaper work as the city editor of the London, Ontario, *Free Press,* and was subsequently associated with the Hamilton *Times,* Parkhill *Gazette,* Chicago *Journal of Commerce* and Strathroy *Dispatch.* In 1874 he acquired the Ottawa *Daily Citizen,* which he edited until 1892. Having been mayor of Ottawa from 1879 to 1881, he sat for Ottawa City as a Conservative from 1882 to 1887 and from 1890 to 1893, and was lieutenant-governor of the North West Territories, 1893-98.

Maclaren, *Ma klar' en,* **Ian,** *E'ahn.* See WATSON, JOHN.

Maclaren, John James (1842-), a Canadian judge, born in the Province of Quebec and educated at Victoria and McGill universities and at the Montreal Royal Military School. Until 1884 he practiced law in Montreal, being counsel in many important cases and appearing before the Imperial Privy Council in a Supreme Court appeal. Until November, 1902, he was in active practice at Toronto, being then appointed a judge of the Supreme Court of Judicature for Ontario and a puisne judge of the Ontario Court of Appeals.

Maclean, *Mak lane',* **John** (1851-), a Canadian author, born in Scotland and educated at Victoria University and at Wesleyan University, Illinois. He was ordained in the Methodist Church in 1880 and served as a missionary to the Blood Indians of Alberta till 1889. He has since held various pastorates in Saskatchewan and Manitoba. From 1902 to 1906 he edited *The Wesleyan,* and his works, some of which are under the pen name of Robin Rustler, include *The Indians of Canada, Our Savage Folk, Lone Land Lights, Better Lives for Common People* and *Science and the Bible.*

Maclean, William Findlay (1854-), a Canadian journalist and legislator, born in Ontario and educated at Toronto University. He commenced his newspaper career with the Toronto *Daily Globe,* and in 1880 he established the Toronto *World,* of which he has been editor-in-chief. He entered the House of Commons in 1892, being a Conservative until 1905, when he assumed an independent position.

MacMahon, *Mak" Ma" on',* **Marie Edme Patrice Maurice de,** DUKE OF MAGENTA (1808-1893), a marshal of France and second president of the Third Republic, born at Sully. After graduating from the military school at St. Cyr in 1827, he saw active military service during the campaign of Algiers (1830) and at the siege of Antwerp (1832), and made a brilliant record in Africa. In 1852 he became a general of division and commander of the Legion of Honor. On his return to France from the Crimean War he received the Grand Cross of the Legion of Honor. In the war with Austria which began in 1859 MacMahon had a large share in the victories of Magenta and Solferino, but in the Franco-German War as head of the First Army Corps he sustained serious reverses, and his army was obliged to surrender after the defeat at Sedan. Following the establishment of the Third Republic he succeeded Thiers as president, holding this office from 1873 to 1879.

McMas'ter, John Bach (1852-), an American historian, born in Brooklyn, N. Y. In 1872 he graduated at the College of the City of New York, spending one year in postgraduate work and becoming a civil engineer. He wrote on engineering subjects and in 1877 accepted a position as instructor in these subjects at Princeton, resigning in 1883 to accept the chair of history in the University of Pennsylvania. The first volume of his work entitled *A History of the People of the United States* appeared in 1883 and the eighth volume in 1912. This is a standard work, showing great research, especially in the pe-

riodical literature of the epoch covered. He has written two school histories of the United States; a life of Daniel Webster; *Benjamin Franklin as a Man of Letters; Origin, Meaning and Application of the Monroe Doctrine; With the Fathers;* and other works on both engineering and history.

MacMonnies, *Mak Mun' iz,* **Frederick William** (1863-), one of the foremost American sculptors, also a painter. His mother was a niece of Benjamin West. For five years he served as an apprentice in the studio of Augustus Saint Gaudens, after which he went to Paris and Munich. His portrait of James S. T. Stranahan brought him a "second-class" medal in the Salon, an unprecedented honor for an American. The *Columbian Fountain* at the World's Fair, Chicago, designed and executed by him, added to his fame. Other notable works are a *Diana; Winged Victory,* at the West Point Military Academy; *Horse Tamer,* in Prospect Park, Brooklyn; and *Nathan Hale,* in the City Hall Park, New York.

Macomb, *Ma koom',* **Alexander** (1782-1841), an American soldier, born in Detroit, Mich. He entered the cavalry, was adjutant-general by the outbreak of the War of 1812, was transferred to the artillery and, having distinguished himself at Ft. Niagara and Ft. George, was promoted to the rank of brigadier-general, in command of the northern frontier. On Sept. 11, 1814, he fought the land Battle of Plattsburg, for which victory he was made major-general and was thanked and awarded a gold medal by Congress. Following the war he was colonel of engineers, and from 1828 until his death was commander-in-chief of the army.

Macon, *Ma' kon,* **Ga.,** an important railroad center and the county seat of Bibb Co., in the central part of the state, on the Ocmulgee River and on the Southern, the Central of Georgia, the Georgia, the Georgia Southern & Florida, the Macon & Birmingham, the Macon, Dublin & Savannah and other railroads. It is 90 m. s.e. of Atlanta and is the third city of Georgia in size. Macon lies in a fertile farming region noted for its cotton and fruits. The city has pleasing surroundings; the interurban roads and drives are well kept, and broaden, as they reach the city, into attractive paved boulevards, shaded residence streets and busy retail districts. The city has large fair grounds, pleasant parks, among which are Tatnall Square, Chickamauga Park and Daisy Park; just east of its limits are the interesting and historic Indian mounds. The public buildings include six orphan asylums, two public libraries, a Federal Building, an Academy of Music, armories, modern county buildings and a number of well-built churches.

Besides the public schools there are many higher educational institutions. Among these are: Mercer Academy (Baptist); St. Stanislaus College (Catholic); Mt. de Sales Academy, a Roman Catholic school for women; the Wesleyan Female College, Ballard Normal School, Central City College and the Georgia State Blind School. Peaches are among the most important fruits shipped; other exports are corn, cotton, lumber, live stock and vegetables. The great Georgia kaolin beds lie near Macon and are extensively worked in this vicinity. Textile mills, lumber mills, brickyards, foundries, machine shops and flour mills represent the industrial life of the city.

Macon was named in honor of Nathaniel Macon, an American statesman. It became a city in 1824, and during the Civil War was an important Confederate treasury depository. It was taken by the Federal troops near the close of the war. Population in 1920, 52,995.

Macpherson, *Mak fur' son,* **James** (1736-1796), a Scottish poet, born at Ruthven, Inverness-shire. He studied at King's College, Aberdeen, and became a schoolmaster. In 1760 he published a series of "translations" of Gaelic verse, under the title of *Fragments of Ancient Poetry Collected in the Highlands.* This book attracted so much attention at Edinburgh University that the faculty there

commissioned Macpherson to go to the field and make further collections. The poet did so, and in 1762 and 1763 published the two volumes, *Fingal, an Epic Poem, in Six Books,* and *Temora, an Epic Poem, in Eight Books.* These were alleged translations of the poems of Ossian, a legendary Gaelic bard and hero of the third century. Soon it was believed that much of the work was original with Macpherson, and not translated, and a long and heated controversy followed. It is now generally accepted that Macpherson added much of his own, but that the poems have a real basis in Gaelic legend.

McPherson, *Mak Fur' son,* **James Birdseye** (1828-1864), an American soldier, born in Sandusky, Ohio, and educated at West Point. He entered the engineering corps. At the opening of the Civil War he was aide to General Halleck, and as chief engineer of the Army of the Tennessee he rendered excellent service at Ft. Donelson, Shiloh, Corinth and Iuka Springs. As major-general of volunteers he so distinguished himself under Grant, in the Vicksburg campaign, as to be made brigadier-general in the regular army. Later he commanded the Army of the Tennessee, and he was efficient in Sherman's Atlanta campaign until killed in the attack upon Atlanta in July, 1864.

MacVeagh, *Mak Va',* **Franklin,** an American merchant, born in Chester County, Pa., and educated at Yale and at Columbia universities. He was admitted to the bar in 1864 and for two years practiced in New York; then he went to Chicago, where he established the firm of Franklin MacVeagh & Company, wholesale grocers, of which he was head until March, 1909. He was defeated as Democratic nominee for United States Senator in 1894, two years later became a Republican and in 1909 entered the Taft cabinet as secretary of the treasury.

MacVeagh, Wayne (1833-1917), an American lawyer, brother to Franklin MacVeagh, born in Chester County, Pa., and educated at Yale. Admitted to the bar in 1856, he was prosecuting attorney, served in the Civil War, and in 1870 was appointed minister to Turkey. As head of the MacVeagh Commission, President Hayes sent him to adjust disputes in Louisiana in 1877; four years later he became attorney-general under President Garfield, from 1893 to 1897 he was ambassador to Italy and in 1903 he was chief counsel of the United States in the Venezuela arbitration before The Hague Tribunal.

Mad"agas'car, an island in the Indian Ocean, separated from the southeastern coast of Africa by Mozambique Channel. In size it is fifth among the islands of the world, being surpassed by Greenland, New Guinea, Borneo and Baffin Land. The greatest length is 980 m., the width 358 m., and the area is estimated at 228,500 sq. m., or two and one-half times that of Great Britain. The eastern and central parts of the island are mountainous, but to the west and south the land is low, and the principal rivers flow into Mozambique Channel. The largest rivers are the Betsiboka, Mangoka, Tsiribihina, Onilahy and Mangoro. The climate of the elevated regions of the island is temperate; that of the lowlands, tropical. There are two seasons, a wet and a dry, along the western coast. In the eastern part the rainfall is excessive and the climate is unhealthful.

The extensive tropical forests are in the east, and diminish in the western part to mere clumps of shrubs or trees on savannahlike plains. The representative species of trees are ebony, mahogany, palm, fir, coconut and ravenala. On the dry, southern plains are cacti and euphorbias. The center of the island is barren and dry. Among the plants grown for food are sweet potatoes, cassava, rice, manioc, groundnuts, yams and coffee. Tobacco, hemp, cotton and sugar cane are also cultivated. The manufactures consist of the weaving of cotton, silk and hemp fibers. The chief native industry is cattle breeding, nearly 3,000,000 cattle being bred. Since 1903, ostrich farming has occupied a fair per cent of the population. The trade is

mostly with France, and French influence on the island has given some stimulus to the cultivation of rice. A railroad has been completed between the east coast and Antananarivo, the capital. In 1902 a wagon road was also completed from the capital to the eastern coast. On this the mails, freight and passengers are carried chiefly by automobiles. Steamship service is maintained between Madagascar and Marseilles.

The natives of the island are known as the Malagasy. There are three principal tribes, the Hovas, the Betsimisarakas and the Sakalavas. Of these, the Hovas are a mixture of Indonesians and Malays, and are thought to have migrated hither eight centuries ago, as the last representatives of the Malay migration. They are the ruling tribe, and many of them are converts to Christianity. French and the Hova language are taught in the schools. There are about 750 primary schools, four normal schools, a school of medicine and an industrial and agricultural school.

Madagascar, referred to by Marco Polo, was probably confused with the African mainland during the 12th century, but in 1500 it was sighted by the Portuguese and named São Lourenço. The island was settled principally by the French, but a native tribe in the heart of the island prevented any progress by foreign powers. Madagascar has been alternately in the hands of the French and the English, and the strength of the natives has caused frequent checks to, and reactions from, European influences. Between 1883 and 1885 a contest for supremacy took place between the natives and the French, with the result that the island was placed under French protection. In 1896 it was made a colony of France. Population in 1905, 2,644,672.

Mad'der, a Mediterranean plant of the Madderwort Family. It is a perennial herb with tiny greenish flowers which are followed by small black berries. The root is fleshy, and from it is secured the coloring matter called dyers' madder, the source of the familiar "turkey red." In Holland one species is extensively cultivated, and particular attention has been paid to the manufacture of the dye. See DYEING.

Madeira, *Ma de' ra,* a river of Brazil and the largest tributary of the Amazon. It is formed by the juncture of several rivers of Bolivia, and flows northeast into the Amazon about 75 m. east of the city of Manaos. With the Mamoré, which is its chief branch, the river is 2000 m. long and is navigable for 1000 m. At San Antonio are the Falls of the Madeira, a series of beautiful cataracts which effectually interrupt navigation. The Madeira is subject to floods and receives its name from the timber (madeira) which at flood time is floated down its current.

Madeira Islands, a group of islands in the Atlantic Ocean, lying about 400 m. w. of the coast of Morocco. Madeira, the principal island, is 38 m. long, 12 m. wide and has an area of 300 sq. m. The other islets are Porto Santo and Deserta Grande. The main island has an even and healthful climate, and is known as a health resort. Its vegetation is abundant and many varieties of fruit are grown. The wine industry has made the island famous; about 700,000 gallons are exported annually. Funchal is the capital. The Madeiras belong to the Portuguese. The population, chiefly of mixed Portuguese, Moorish and negro blood, exceeds 150,500.

Madero, Francisco Indalecio (1873-1913), a Mexican political leader, born in Coahuila upon the estate of his grandfather, a wealthy landowner. In his early young manhood he assumed the care of the family estates and conducted affairs with such skill as to win the respect of his associates and neighbors and the good will of his employees. He introduced modern methods of mining and of agriculture, and by means of an excellent system of irrigation made possible the introduction of new crops into Mexico. In 1900 Madero came to the City of Mexico, where he became at once interested in political affairs and founded a political organization, branches of

which were soon known in almost every state of Mexico. In 1905 he opposed the Diaz administration openly and suffered many indignities through his zeal. In 1910 he issued his famous book *The Presidential Succession of 1910,* and became himself a candidate for president upon the Independent, or "Democratic," ticket. His suggested reforms included: a fair distribution of the land, which was chiefly in the hands of a few wealthy landowners; the restitution of the Indian lands; the liberation of political prisoners and prisoners of war; and free speech. Madero was arrested before the election, but escaped and by his stirring "Call to Arms" instituted a revolution which resulted in the final overthrow of the Diaz government.

He was elected president in October, 1911, and immediately set about the introduction of the promised reforms. Whatever his other mistakes, Madero showed great generosity to his enemies, and wisdom in the control of his divided people. In the revolution of 1912-13 Madero was arrested and was killed either accidentally or by design on Feb. 13, 1913. Because of the unsettled condition of the country a characterization of Madero's administration cannot yet be given. His sincerity and his evident desire for the welfare of his people cannot, however, be questioned.

Mad'ison, James (1751-1836), fourth president of the United States, born at Port Conway, Va. He was the son of James Madison, a man of English descent who early settled in Virginia. The son prepared for college under private tutors, and graduated from Princeton in 1771, remaining for another year to study Hebrew. His early studies were very painstaking. It is said that for minute and thorough knowledge of ancient and modern history and of constitutional law he was unequaled among Americans of the Revolutionary period.

In 1774 Madison was appointed a member of the Committee of Safety, and early in 1776 he was chosen a delegate to the Virginia convention that formed the state constitution. Here he advocated the incorporation of a provision assuring absolute religious liberty to all men. He was a member of the first Legislature under the new constitution, and from 1780 to 1783 he served in the Continental Congress. He was then again elected to the Virginia Legislature, where he strongly advocated a more effective national union of the colonies.

Madison was a delegate to the convention of states which met at Annapolis in 1786 to consider interstate commercial relations. This body, largely through Madison's efforts, proposed the general convention of states that met in Philadelphia the following year to form the present Constitution of the United States. In the Federal Convention thus called he was an influential member, presenting in the "Virginia Plan" the basis of some of the most important provisions of the Constitution. He rendered the further service of keeping a careful record of the proceedings of the convention, which is our main source of information concerning the deliberations of this important body. After the convention he joined with Hamilton in writing *The Federalist,* aimed at securing the ratification of the Constitution by the states, and was especially influential in its ratification by Virginia. His services were so great in this whole matter of the organization of a government with genuine national powers, that he has been called the "Father of the Constitution."

In 1789 Madison became a member of the first House of Representatives under the new Federal Constitution, serving throughout Washington's presidency. His influence was exerted to confine the powers of the general government to those granted by the Constitution. He therefore allied himself with the Anti-Federalist, or Republican-Democratic, Party. He retired from Congress in 1797 and reentered the Virginia Legislature. When Jefferson became president in 1801 he appointed Madison, who was his close personal friend, secretary of state, which position he held during both terms of Jefferson's administration. He was elected to succeed Jefferson in the

presidency in 1809, and was reelected for a second term beginning in 1813.

While president, Madison was forced into the War of 1812, which, being a man of peace, he was not entirely successful in conducting (See WAR OF 1812). After the expiration of his second term, he retired to Montpelier, his country home in Virginia, which for the next 20 years was the Mecca of public men, where Mrs. Madison, one of the most celebrated women ever mistress of the White House, dispensed gracious hospitality.

Madison, Wis., a city, county seat of Dane Co. and capital of the state, 82 m. w. of Milwaukee and 120 m. n.w. of Chicago, between lakes Mendota and Monona, and on the Chicago & North Western, the Illinois Central and the Chicago, Milwaukee & St. Paul railroads. Madison is situated in an agricultural region and is an important commercial center for central and southwestern Wisconsin, having an extensive trade in farm, garden, dairy and tobacco products. The city has a picturesque situation in what is called the "Four Lakes Region." This region takes its name from Waubesa, Kegonsa, Mendota and Monona lakes, which are connected by the Yahara River. The streets are wide and beautifully shaded, with a profusion of elms and maples. Brittingham, Tenney, Vilas and Capitol parks are attractive, and along the shores of Lake Mendota there is a 12-mile boulevard and parkway. There are many handsome residences and the city and vicinity are noted summer resorts. The principal building is the state capitol, situated in a park at the summit of a hill near the center of the city. The old capitol building was destroyed by fire in 1904 and has been rebuilt of granite, on a magnificent scale, at a cost of over $6,000,000. Other public buildings include the Federal Building, city hall, courthouse, Fuller Opera House, banks and substantial business houses. There are about 22 churches.

Madison is a prominent center of higher education and the city is the seat of the University of Wisconsin (See WISCONSIN, UNIVERSITY OF). Connected with the university is the Washburn Observatory. The State Historical Library and Museum is housed in a handsome Ionic structure built at a cost of $700,000, and contains a valuable collection of historical mementoes and a reference library of about 240,000 volumes. This is considered one of the best historical libraries in the United States. The building also contains the libraries of the university and the Wisconsin Academy of Sciences, Arts and Letters. There are also the Carnegie, the Woodman Astronomical and the State Law libraries. Other educational institutions include the Wisconsin High School, connected with the state university, a high school, public and parochial schools and the Academy of the Sacred Heart (Catholic), a boarding school for girls and several business schools. On the shores of Lake Monona lies Monona Park, owned by the city. The extensive experimental farm of the Wisconsin State College of Agriculture lies near the limits of the city. The state hospital for the insane is located at Mendota, a distance of about six miles from the city. Near the city, at Fitchburg, is one of the five fish hatcheries maintained by the state.

The manufacturing industries are represented by machine shops, stereotype and other foundries, agricultural-implement works, boot and shoe factories, machine shops, electrical-appliance works and flour mills. There are also several large printing establishments and a beet-sugar plant. In 1836 Wisconsin was organized as a territory by act of Congress, and the same year Madison was selected as the capital. The place was named in honor of James Madison. The first constitutional convention met here in 1846, and in 1856 a city charter was granted. Population in 1920, 38,378.

Madon'na, a term in use in all languages to denote the Virgin in art. It is from an Italian word meaning my lady. There are many Madonnas by various artists and about 50 are consid-

ered worthy of special mention by the greatest art critics. Each takes its name from some feature of the picture, as the *Madonna of the Chair,* which represents the Virgin seated and holding the infant Jesus in her arms; or from the place for which the painting was originally intended, as the *Sistine Madonna.* Raphael was the greatest painter of Madonnas. The most noted of these are *Madonna della Candelabra,* in London; *Madonna di Ansidei,* National Gallery, London; *Madonna of the Canopy,* in the Pitti Palace, Florence; *Madonna Belle Jardinière* (Pretty Gardener), in the Louvre; and the *Sistine Madonna,* now in the Dresden Gallery. The last is one of the Twelve Great Paintings of the world. It conveys the artist's idea of the Virgin as the Queen of Heaven. She is descending from the clouds and holds the child Jesus in her arms. On either side St. Barbara and St. Sixtus kneel in adoration, and below are two cherubs famous for their beauty. This picture was painted for an altarpiece for the Church of San Sisto at Piacenza, from which it takes its name. It was finished a short time before Raphael's death. See RAPHAEL SANZIO.

The greatest German Madonna is the *Madonna of Burgomaster Meyer,* by Holbein. The *Madonna with St. Anne,* by Leonardo da Vinci, and the *Madonna of the Rosary,* by Domenichino, are also widely known.

Madras', a seaport on the eastern coast of India, capital of the Presidency of Madras, situated on the Bay of Bengal. The educational institutions of Madras include the Presidency College, the government school of arts, six missionary colleges, a law college, a medical college and a school of engineering. Among other buildings are the Scottish Church of St. Andrews, the St. George's Cathedral, several Mohammedan and Hindu temples, the government house and the Chepauk Palace. The harbor is not commodious in itself, but several improvements have been effected. Only within recent years have the industries become numerous and important. They consist of clothing, earthenware, soap, flour, machinery and canned fish. Madras was founded in 1640, at which time Francis Day, the head of the East India settlement at Armagon, received a grant of the present site of the city from one of the native princes. Population in 1906, 522,972.

Madras, Province of. See INDIA.

Madrid', the capital of Spain, and of the Province of Madrid in New Castile, situated on the left bank of Manzanares River, on a high plateau of sand and clay that is treeless and barren. The climate is variable, but its severe extremes of heat and cold are relieved by an unusual clearness and dryness of the atmosphere. The business center of the city is in the plaza, the La Puerta del Sol, where are found the chief public buildings and where the street railways of the city terminate. The streets of new Madrid are broad and clean; the old part contains irregular houses of antiquated architecture. The magnificent boulevard running north and south the entire length of the city is one of the finest promenades in the world.

Among the buildings are the royal palace, the National Library and Museum, the government buildings, the city hall, the Royal Exchange, the Bank of Spain, the University of Madrid, with over 5000 students, the National Library, the National Museum with a collection of masterpieces by Raphael, Titian, Rubens, Tintoretto, Velásquez and Van Dyck, which makes it one of the most valuable picture galleries in the world; and several important theaters, the Teatro de la Comedia being the most popular. The bull ring, or Plaza de Toros, is of Moorish architecture, and built in magnificent style with a seating capacity of over 13,000 spectators. The libraries and museums are numerous and valuable, and Madrid is the educational center of Spain, being the seat of the Spanish Academy and the Geographical, Historical and Anthropological societies.

Since 1890 Madrid has seen an extraordinary industrial development. The manufactures include leather goods,

jewelry, fans, umbrellas, musical instruments, chemicals, pottery, drinks of all kinds, soap and perfumes. Its commercial importance is still more significant. In the tenth century Madrid was occupied by the Saracens; Philip II made it his capital in 1560. Population in 1919, 648,760.

Maelstrom, *Male' strom.* See WHIRLPOOL.

Maeterlinck, *Mah' ter link,* **Maurice** (1862-), a Belgian-French dramatist and poet, born in Ghent, Belgium. He studied at the Collège Sainte-Barbe and at the university of his native town, and was admitted to the bar in 1887. In 1896 he removed to Paris and devoted all his time to literature. All his work is touched with mysticism, becoming a revelation of the mysteries that are closely related to ordinary life. At times his characters are mere phantoms moving in an unreal world; a spiritual life is revealed, however, lacking in neither intensity nor tragedy. In 1911 he was awarded the Nobel prize for literature. His works include *The Intruder, The Blind, Seven Princesses, Monna Vanna, Pelléas et Mélisande, Joyzelle* and *The Blue Bird.* Among his essays are *Wisdom and Destiny, The Treasure of the Humble* and *Life of the Bee.*

Mafia, *Mah' fe ah,* a secret order among Italians. It probably originated in Sicily, where its members are most numerous. The chief object of the organization is to protect its members from the law for any crimes they may commit. Silence, secrecy and absolute obedience to the commands of the leader of the band are among the chief requirements of members. The order has been the cause of many murders in all countries where Italians are found, and in 1890 it caused serious trouble in the United States, when the chief of police in New Orleans was supposedly murdered by a member of the organization. The Italian Government has not been able to suppress the Mafia.

Magazine, *Mag" a zeen',* a storehouse, in military usage a storehouse for ammunition. The *expense magazine* is that from which the troops draw the ammunition needed for each day. It is located conveniently, at a safe distance, and may be built underground or in the defenses, protected by bombproofs. In war vessels the magazines are located deep below the water line and as far as possible from the engines, and every precaution is taken to keep them cool, and safe from everything combustible.

Magazine. See NEWSPAPER.

Mag"dale'na Bay, a large bay indenting the western coast of the South District of Lower California. At its mouth lies the Island of Santa Margarita, and it is protected from the ocean by a low sand bar. The bay itself is among the finest harbors of the Pacific and has a length of nearly 50 m. The town of Magdalena is located at the head of the harbor. In 1912 it was rumored that the Japanese were to purchase land bordering on Magdalena Bay. Since the purchase would be a violation of the Monroe Doctrine, it was strenuously opposed by the United States. See MONROE DOCTRINE.

Magdalena River, the principal river of Colombia, rising near the Ecuador boundary and flowing north to the Caribbean Sea. Steamers ascend the river for 600 m. to Honda, where there are rapids. A railroad has been built about these and navigation continues on the upper river to the city of Neiva. The principal tributaries are the Cauca and the Sogamoso. Its total course is 950 m. The Magdalena forms the chief means of communication between the interior of Colombia and the sea.

Magdeburg, *Mahg' de boork,* the capital of the Province of Saxony, in Prussia, situated on the left bank of the Elbe River, 88 m. by rail s.w. of Berlin. It is a modern fortress and the citadel is situated on one of the islands of the Elbe; the remaining fortifications consist of detached forts and redoubts. The principal buildings of the city are the magnificent Gothic Cathedral of SS. Maurice and Catharine, Church of Our Lady, the Rathaus, the exchange, the Reichsbank and the old royal palace.

The manufactures are represented by the large beet-sugar works (the most extensive in Germany), machine works, including the famous Gruson and Krupp works at Buckau, distilleries, chemical works, etc. Magdeburg was first known to history in the ninth century. In 937 Otto the Great erected a monastery there and in 968 it was made the seat of an archbishop. It accepted the Reformation in 1524 and played a prominent part in that movement. It was besieged during the Thirty Years' War by both Wallenstein and Tilly, suffering heavy losses. Population, about 230,000.

Magellan, *Ma jel' an,* **Ferdinand** (?-1521), a famous explorer, and discoverer of the strait that bears his name. He was born in Portugal. In 1517 he offered his services to the King of Spain to find a westward passage to the Spice Islands, and in 1519 set sail from Seville with a fleet of five vessels. In February, 1520, he reached the entrance to the Rio de la Plata, and in October of that year arrived at the strait that bears his name. Sailing through the strait, he entered the Pacific Ocean and reached the Philippines in March, 1521. Here he was killed, Apr. 27, in a conflict with the natives. One of his vessels, however, made the journey back to Spain, and for this reason Magellan is honored as the first circumnavigator of the globe.

Magellan, Strait of, a passage connecting the Atlantic and Pacific and separating the Continent of South America from the Island of Tierra del Fuego. It is 370 m. long and varies in breadth from 2½ m. to 70 m. Enclosing a number of small islands and subjected to squalls in stormy weather, navigation of its waters is often unsafe. Punta Arenas is the only harbor of importance. The strait is of great convenience to steamers and constantly used. It was discovered by Magellan in 1520.

Maggiore, *Mahd jo' ra,* **Lake,** or **Lago, Maggiore,** a lake partly in northern Switzerland and partly in the Swiss Canton of Ticino. It is 37 m. long, from 2 to 6 m. wide and has an area of 82 sq. m. It is 636 ft. above the sea and has a greatest depth of 1221 ft. Only the eastern bank is lowland and descends to the plains of Lombardy; the other sides are lined with mountain ranges containing lofty snow-capped peaks. There are many small towns along its shores, which are popular winter resorts for foreigners because of their picturesque location and favorable climate. Steamers at frequent intervals connect the principal points on the lake, and a railroad skirts its eastern shore.

Magi, *Ma' ji,* among the Medes and Persians, a caste of hereditary priests who managed the sacred rites, guarded and propagated the sacred traditions and practiced divination and astrology. Exercising great public and private influence, they educated the princes of the realm and were companions to the monarchs. The reforms of their founder, Zoroaster, enforced on them a simpler and more abstemious life than they had previously led. The name *magi* came gradually to be applied to any holy man or sage in the East. According to tradition, the Magi who came to see the infant Savior were named Melchior, Balthasar and Gaspar, and their bones supposedly rest in the Cathedral of Cologne. In art, one of the three is represented with a swarthy complexion.

Magician, *Ma jish' an,* one who through superior knowledge and skill is able to perform, or give the impression of performing, deeds which, to those less sophisticated, appear to require magical or supernatural powers and perhaps even the assistance of departed spirits. Among savages the native magician is often considered a sorcerer. He may be the priest and possibly the chief of the tribe. The magicians of ancient Egypt, Babylonia, Assyria, Greece and Rome hold an important place in the history of those civilizations. Incantations and sacrifices were systematically employed; and curiously wrought amulets and talismans, often engraved with magical inscriptions, were prepared with much ceremony and worn in profusion. The term is now frequently applied to one who is skillful in sleight-of-hand performances.

Magic Lantern. See STEREOP'TICON.

Magna Charta, *Mag' na Kar' ta,* or **Great Charter,** a document embodying the ancient privileges of the barons and of the people of England. It consists of a preamble and 63 clauses, chiefly relating to abuses of the times. Its primary aim was the protection of the feudal proprietor against the abuse of royal power, but its greatest value lay in its preservation of the idea of legal contract between the king and his subjects, and in the consequent growth of Parliamentary power. Among the provisions of the Charter are clauses defining and limiting feudal rights, establishing fixed law courts, and requiring trial for a noble by his peers. There was to be no extraordinary tax without the consent of those taxed, no arbitrary banishment or imprisonment, and no denial, sale or delay of justice. One standard of weights and measures was established, and the Church of England was declared free.

The Charter was granted by King John of England in 1215, in response to a demand made by a confederation of the barons. John was entrapped at Runnymede, near Windsor, and was there forced to sign and seal the document. The Magna Charta has been called by Hallam "the key stone of English liberty."

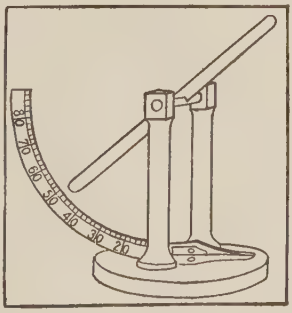
Magnesia, *Mag ne' zhi a,* or **Magnesium Oxide,** the product of the burning of magnesium in the air. It is a white, tasteless substance and is of value medicinally as a mild cathartic. It is used in the manufacture of crucibles and is a basis of many cleaning powders.

Magnesium, *Mag ne' zhi um,* a well-known element occurring so widely as dolomite that entire mountains are formed from it. With other elements it occurs as soapstone, meerschaum, hornblende, asbestos, serpentine and clay. It is also found in sea and mineral waters and in some plants and animals. Magnesium is a tin-white metal, quite ductile at high temperature, and it oxidizes sufficently to become covered with a thin, bluish coat of its oxide. On account of the brilliant light with which it burns, it is used in signal lights, fireworks and "flash-light" powders in photography. Its oxide, a white powder generally known as magnesia, has such a high melting point that it is used in making electric furnaces and fire bricks. Magnesium sulphates found in the spring waters at Epsom are called Epsom salts and are used medicinally.

Mag'net, a body having the power to attract iron, steel, cobalt and nickel. Natural magnets are found in the form of an ore known as magnetite, or loadstone. This is an ore of iron possessing naturally strong magnetic properties. An artificial magnet is a bar of iron or steel which has been magnetized. Artificial magnets are named, according to the shape, bar magnets or horseshoe magnets. The latter, when not being used, generally have a bar of soft iron, called an armature or keeper, placed across the ends. The magnetic force is seen to be stronger near the ends of a magnet, which are therefore spoken of as the poles. An electromagnet is a magnet which is maintained by passing an electric current through coils of insulated wire wound about a piece of iron or steel. See MAGNETISM; ELECTROMAGNET.

Magnet'ic Induc'tion. See INDUCTION, MAGNETIC.

Magnetic Needle, a small magnetized bar, or needle, so suspended or hung on a pivot that it can swing freely in a horizontal plane. Its final position is practically north and south, and if moved from this position it tends to return to it. The end of the needle which points north is called the north, or north-seeking, pole; the other, the south pole. The north pole is also frequently spoken of as the marked end. In most localities the mag-



DIPPING NEEDLE

netic needle does not point truly north and south; the angle between the direction the needle does point, called the magnetic meridian, and the true meridian, is called the magnetic declination at that place. In the Central States the needle points east of north, the declination varying from 4° to 12°. Its chief practical use is in the surveyor's compass and in the mariner's compass. In determining the direction of true north from either instrument, the observer must know the magnetic declination for the locality where he is.

Dipping Needle, a magnetic needle so suspended that it swings freely in a vertical plane. It is used in studying the magnetism of the earth at different localities. North of the equator the north pole of the needle dips downward, while south of the equator the south pole dips. At the magnetic equator the needle remains level and at each of the magnetic poles it stands vertical. Unless the vertical plane in which the needle is free to swing is placed in the magnetic meridian, that is, north and south according to the magnetic compass, the angle of depression, or dip, will not be correct. A graduated scale is arranged in such a manner that the dip may be easily read in degrees of angle. The angle of dip, also called the angle of inclination, varies in the Central States from 60° to 75°. See Compass, Magnetic.

Mag'netism, that property of matter whereby certain substances, especially soft iron and steel, tend to attract or repel each other. The name comes from Magnesia in Thessaly, the place where natural magnets were first found. Pieces of the ore, variously called magnesian stone and loadstone, or lodestone, were found not only to attract each other but to have the peculiar property, if suspended so as to swing freely, of pointing north and south. This advantage, eagerly made use of by mariners, led to its being called leading stone. A piece of steel or iron, if rubbed with a natural magnet, was found to assume the same properties and thus became an artificial magnet. Magnetic force always acts in paths that form closed circuits, and the field in which all these lines of force lie is called the magnetic field; thus a magnet in the form of a closed ring does not attract other objects because the circuit made by the lines of force is completely closed. If, however, the ring be broken and the halves separated, the lines of force will pass across the open space. A magnetic substance placed across the opening forms an easier path for the lines of force than does the air, and thus is strongly attracted. When the magnet is a straight bar, the lines of force pass through the air in widening curves. This is easily shown by holding a magnet under a card upon which iron filings have been sprinkled; if the paper is jarred so that the filings are drawn into the magnetic paths, a visible magnetic field is made.

Because one extremity of the bar magnet when freely suspended always points toward the north and, even if swung halfway around, always returns to its original position, the north-pointing end of the magnet is called the north-seeking, or the north, pole, and the other the south-seeking, or the south, pole. If the north pole of one magnet is brought near to the north pole of another, the two are strongly repelled, but if the north pole of one is brought to the south pole of another the two are strongly attracted. No matter into how many pieces a magnet may be broken, each piece has its north and its south pole.

Technically, a magnetic pole is said to be of unit strength if it will repel a like pole placed at a distance of one centimeter from it in air, with a force of one dyne. A magnetic field is said to be of unit strength if it will exert a force of one dyne on a unit pole placed in it; in common practice, such a field is said to have one line of force per square centimeter, the square centimeter being taken perpendicular to the direction of the field. Hence field strengths are stated in terms of lines of force per square centimeter; a field having a strength of five units is said to have five lines of force per square centimeter.

Magnetism is an important factor which plays a useful part in the arts and sciences. Acting through the compass, it directs navigation and guides travelers in unexplored territory. It is an important factor in producing electricity in the dynamo (See DYNAMO), and in transforming the electrical power into mechanical power in the motor. It is of great value in lifting heavy iron and steel bars, in raising steel plates whose shapes render them not easily fastened by cables, and in holding drilling machines to steel plates while holes are being drilled for purposes of construction. In surgery, magnetism aids in removing pieces of steel from the eye or from other parts of the body; in autos, traction cars, etc., it works the brakes; and along railway lines it operates the signals.

Terrestrial magnetism refers to the earth as a magnet; its poles, which vary in position, lie, one in the Northern and the other in the Southern Hemisphere, but not at the geographical poles. At the north magnetic pole a bar magnet would stand vertically with its north pole pointing toward the earth; at the south pole the reverse would be true. See ELECTROMAGNETISM; MAGNETO; MAGNET.

Mag'netite, or **Magnetic Iron Ore,** a valuable ore of iron, which contains 72 per cent of that mineral and a large proportion of oxygen. It has a metallic or submetallic luster, is black in color, brittle and hard. The distinguishing quality of magnetite is its strongly magnetic property; another quality is the occasional presence of magnetic polarity, in which case it is called loadstone and constitutes a natural magnet. The ore is found in great abundance in Sweden, Canada and the northern and eastern parts of the United States. Magnetite is almost universally present as a constituent of igneous, sedimentary and metamorphic rocks, occurring sometimes massive, sometimes in granular form; and it is often found with an intermixture of sand, from which it can be separated with profit by washing the sand in sluices containing riffles, through which water is flowing rapidly.

Mag'neto, or Magneto-Electric Machine, a small dynamo or electric generator whose fields are produced wholly or in part by permanent steel magnets. Magnetos are widely used in ignition systems for gas and gasoline engines; the current generated by the magneto is caused to jump a small gap and thus make a spark that ignites the gas and air mixture in the cylinder of the engine. A few machines are made with a commutator and auxiliary field windings and are thus essentially small direct-current dynamos, though the current is not very uniform but somewhat pulsating in character. Such machines may be used in connection with storage batteries for lighting automobiles, and with a mechanical interrupter for exciting the spark coil of the ignition system.

For ignition purposes the commercial magneto usually has two auxiliary features built in with it; an arrangement revolving with the armature shaft for automatically breaking the armature circuit usually two times during each revolution; and another arrangement geared to the armature shaft for automatically connecting the high-potential circuit to the spark plug of each engine cylinder in turn. In all such cases it is, of course, necessary that the armature of the magneto be connected to the shaft of the engine by suitable gears or otherwise, so that it will always give its sparks at the proper times for the explosion of the gas-air mixtures in the successive cylinders of the engine. See TRANSFORMER; INDUCTION COIL; DYNAMO.

Magno'lia, a large, pyramidal-topped tree of the Magnolia Family, of which 20 species are known in eastern North America, southern Mexico and southeastern Asia. The most common American magnolia grows from 60 to 80 ft. in height and has scaly, gray or light brown bark, small, spreading branches, marked by prominent leaf scars, and many leathery, shining green leaves. The large, showy flowers appear after the leaves, and have three spreading sepals and

from 6 to 12 large white petals. The fruit is a scarlet cone whose seeds when ripe hang by long, delicate threads. All parts of the tree have a bitter taste and a somewhat aromatic odor; the bark and dried flower-buds are used medicinally.

The species of magnolia found in the United States are variously called mountain magnolia, sweet bay and cucumber tree. The magnolia is the state flower of Mississippi, Louisiana and Georgia. See CUCUMBER TREE.

Mag'pie, a bird of the Crow Family. It is from 17 to 21 inches in length, of which the tail occupies 10 to 12 inches. The color is black, with bronze iridescence, white under parts and white wing patches. The nest is built in willows, thorn bushes, mulberry bushes, etc., and is made of large sticks, lined with mud, grass, hair and pine needles. It contains seven brown-spotted eggs. The magpie inhabits Europe and northern Asia, as well as parts of North America, where it is known as the blue-billed magpie. Being extremely sociable, magpies often gather in flocks of considerable size. They make interesting pets, being taught to talk to a limited extent, but are very inquisitive and are too mischievous to be allowed much freedom.

Magruder, *Ma groo' der,* **John Bankhead** (1810-1871), an American soldier, born in Winchester, Va., and educated at West Point. He served in the war against Mexico, and at the outbreak of the Civil War joined the Confederates, commanding in the defense of Richmond as brigadier and as major-general. Late in 1862 he commanded in Texas, New Mexico and Arizona, and he was in charge of an expedition against Galveston. Following the war, he served with the imperial army in Mexico until the downfall of Maximilian.

Mahan', Alfred Thayer (1840-1914), an American naval officer and writer, born at West Point, N. Y. After graduating from the United States Naval Academy, he entered the navy and remained in the service over 40 years, being retired in 1896 at his own request. He took an active part in the Civil War. From 1886 to 1889 and again from 1892 to 1893 he was president of the Naval War College, and during the Spanish-American War he was a member of the naval board of strategy. In 1899 he was a delegate to the Peace Conference at The Hague. Admiral Mahan's long experience and powers of observation, together with his study of naval affairs, made him one of the most eminent naval authorities of his time. He was the author of a number of works upon naval affairs, the most important of which is *The Influence of Sea Power Upon History, 1660-1783,* a work that was practically epoch-making in its influence. Among his other works are the *Life of Nelson, the Embodiment of the Sea Power of Great Britain* and *Lessons of the War with Spain.* Honorary degrees have been conferred upon Admiral Mahan by the universities of Cambridge, England; McGill, Montreal; and Harvard, Yale, Columbia and Dartmouth in the United States.

Mah"anoy' City, Pa., a city of Schuylkill Co., 13 m. n.e. of Pottsville and 55 m. n.e. of Harrisburg, on the Mahanoy Creek, in a valley bounded on the southeast by Broad Mountain, and on the Philadelphia & Reading and the Lehigh Valley railroads. Its prosperity is derived from anthracite mines, but it has foundries, potteries and flour, lumber and hosiery mills, etc. The borough has a public library and public and parish schools. It was settled in 1859 and incorporated in 1863. Population in 1920, U. S. census, 15,599.

Mahog'any, a valuable tree of the Mahogany Family, found chiefly in the tropics. The trees are noted for their dark, heavy wood, which has long been prized as the finest furniture wood. The leaves are evergreen and made up of many small leaflets; the flowers and fruit are small and inconspicuous. The tree which produces the best wood grows slowly and becomes mature only after 200 years. Imported mahogany comes chiefly from Mexico and the West Indies. A Florida mahogany produces a timber used for the interior decoration

of cars and houses, and from the same tree a bitter drug, employed as a substitute for quinine, is made.

Mahom'et. See MOHAM'MED.

Maid'enhair", a beautiful woodland member of the Fern Family uncommon enough to be fully appreciated. Its stems are stiff and slender, almost wirelike, but of a lustrous brown color, and have given the plant its name. The stem branches at a height of eight or ten inches from the ground, and these branches bear tiny wedgelike, green leaflets and are set off by the darker shadings of the stems. These ferns are found over scattered localities, often growing in great quantities but sometimes represented by a single plant. Their haunts are shady or rocky woodlands where the soil is moist and the air cool.

Maid of Orleans, *Or' le anz.* See JOAN OF ARC.

Maine, *Mane,* THE PINE TREE STATE, the most northeasterly state of the Union and one of the New England states, is bounded on the n. and e. by New Brunswick, on the s. by the Atlantic Ocean and on the w. by New Hampshire and the Province of Quebec.

SIZE. The greatest length is 303 m., the greatest breadth is 212 m. and the area is 33,040 sq. m., of which 3145 sq. m. are water. Maine is a little larger than South Carolina, a little smaller than Indiana, and it lacks only 344 sq. m. of being as large as all the other New England States combined. It is the 38th state in size.

POPULATION. In 1920 the population was 768,014. Between 1910 and 1920 there was a gain of 25,643 in the population, or 3.5 per cent. There are 25.7 inhabitants to the square mile and the state's rank in population is 35.

SURFACE. In general the surface is rolling upland, on which rise clusters of mountains and isolated peaks, through which are cut numerous river valleys. The highest peak is Mt. Katahdin, 5273 ft., situated a little north of the central part of the state. Other prominent peaks, most of which are in Franklin County, are Saddleback Mountain, 4000 ft., Mt. Abraham, 3388 ft., Mt. Bigelow, 3600 ft., and Mt. Blue, 3200 ft. A divide extending in an east and west direction across the state, a little north of these mountain peaks, separates it into north and south slopes. At the western boundary this divide has an elevation of about 2000 ft., but at the eastern boundary it is only 600 ft. high. North of this divide the surface slopes gently toward the northeast, and with the exception of hills and mountains near the southern border and in the central part it contains no highlands. As a whole this region is poorly drained and marshy.

The region south of the divide contains nearly all the mountains, is more hilly and in general descends to the south with a more rapid slope, the fall being greatest in the west. The shore line is unusually irregular, as shown by comparing the shore measurement with the distance from Eastport to Portland, in a straight line. Thus measured, this distance is about 200 m., while the length of the coast line between these points is nearly 2500 m. Along the coast are many drowned valleys, which form excellent harbors, and off the coast are numerous islands belonging to the state. Of these Mt. Desert Island is most widely known.

RIVERS AND LAKES. Most of the region north of the divide is drained by the St. John, whose principal tributary is the Aroostook. South of the divide are the St. Croix, forming a part of the eastern boundary; the Penobscot, the Kennebeck, the Androscoggin and the Saco.

Maine has about 1600 lakes. The largest, Moosehead Lake, is situated north and west of the center. It has an area of 500 sq. m. and is the largest lake wholly within New England. Chesuncook Lake, Rangeley Lakes and Sebago Lake are the others most prominent.

SCENERY. The pine forests and clear lakes with their wooded shores, the isolated mountain peaks piercing the clear sky, and the numerous streams combine with the undulating surface of the uplands to form charming and beautiful

scenery, which makes the state attractive both to visitors and to the permanent inhabitants.

Climate. The most northern boundary is 47° 30′ north latitude, and that portion of the state north of the divide has long and severe winters, lasting from five to seven months. South of the divide the winters are shorter and less severe. The summers are cool and salubrious. The growing season in the south is limited to about five months, and in the north it is even shorter. As shown by records kept at the state university for 42 years, the mean temperature for January is 16.5° and for July, 67.2°. There is abundant rainfall and most of the state is subject to heavy snows. The salubrious summer climate; extensive forests in which game is still plentiful; beautiful lakes containing fish; deep woods, the haunts of moose and bear; and the numerous islands along the coast affording excellent camping facilities,—all make Maine one of the most attractive states for summer tourists, and it claims to have a larger number of summer tourists than any other state in the Union.

Minerals and Mining. There are numerous outcroppings of granite along the coast and farther inland. Quarries are worked in a number of localities where the rock can readily be shipped by water. Some of the most extensive quarries are located at Hallowell, Dix Island, Vinalhaven and Freeport. The stone is of excellent quality and is used for building purposes. Marble is found in the southwestern part of the state, and slate of good quality occurs in the central part. Some mica is also quarried. Lime is quarried in large quantities at Rockland and Rockport. Brick, tile and other clay products are manufactured in increasingly large quantities. Valuable deposits of tourmalines and other precious stones are found at Mt. Mica in the town of Paris, at Mt. Apatite in Auburn, and in other localities.

Forests and Lumber. In the colonial period the entire state was covered with forests, in which white pine predominated, but the southern part of the state has been cleared and converted into farms. The central and northern parts are still forested. Throughout the state trees grow with remarkable rapidity, and it is claimed that deforestation is impossible except by extensive fires.

Although lumbering is not so extensive as formerly, it is still one of the leading industries. Large quantities of spruce are cut for the manufacture of wood pulp and for timber. In the central part of the state are forests of white birch, which is used in the manufacture of spools.

Agriculture. The farms of Maine, like those of the other New England States, are small and are tilled by their owners. Diversified farming is generally practiced and a variety of crops is raised.

Soil. The strongest and most fertile soil is found in the river valleys, but that on the uplands produces good crops.

Products. The chief farm crops are hay, potatoes, oats, buckwheat, rye, corn, barley and wheat. Maine produces the finest sweet corn in the world, and large quantities are raised for canning. The canned corn is shipped to other parts of the country. Apples and small fruits are grown in paying quantities. Raising horses and cattle for market, and dairy husbandry are also important branches of agriculture. Dairy products amount to about $13,000,000 a year.

Fisheries. The fisheries of Maine rank second only to those of Massachusetts among the New England States. The lakes and streams are well stocked with trout, bass, pickerel and salmon. From the coast waters cod, herring, haddock, menhaden and other fish are taken in large quantities. One species of herring is canned in large quantities and marketed as sardines. Lobster and clam fishing is also important. The fisheries give employment to about 17,000 persons and the catch in 1910 was valued at $5,864,000.

Manufactures. The water power within the state is almost beyond estimate, and it has been a valuable aid in

developing manufactures. Long before Maine became a state, shipbuilding was an important industry, but after the advent of steel ships this declined. The chief industries are the manufacture of leather, of cotton and woolen goods, of flour and gristmill products, of lumber and its allied products, of wood pulp and paper and of machinery, and the canning of fish and vegetables.

Transportation and Commerce. The numerous harbors along the coast and the estuaries of the Kennebec and Penobscot, both of which are navigable for about 60 m., afford excellent water communication. Lines of steamships run from Boston to Portland, and to cities on the Kennebec River, Penobscot Bay and River, Mt. Desert Island and to Eastport. The Boston & Maine, the Grand Trunk, the Canadian Pacific, the Maine Central and the Bangor & Aroostook railroad systems have lines extending throughout the state in various directions and connecting with the great trunk lines of New England and the West. Portland is the chief railroad center. Numerous electric lines connect towns and cities in the densely populated portions of the state.

Paper, wood pulp, lumber and lumber products, cotton and woolen goods, agricultural products, canned goods, fish, granite, lime and slate are exported. Raw material for manufacturing, foodstuffs and manufactured goods are imported.

Government. Maine has but one constitution, which was adopted in 1819. The governor is the only state officer elected by popular vote. There is no lieutenant-governor, but the governor is assisted by a council of seven members elected by the Legislature. The treasurer, attorney-general and commissioner of agriculture are elected by the Legislature. The terms of all state officers are for two years.

The Legislature consists of a Senate of 31 members and a House of Representatives of 151 members. All members are elected for two years and sessions are held biennially. All appointments made by the governor must be confirmed by the council. The president of the Senate succeeds to the governorship in case of vacancy. In 1908 an amendment to the Constitution providing for the initiative and referendum was adopted.

The judicial department consists of a Supreme Court with a chief justice and seven associate justices, appointed by the governor for seven years. Sessions of this court presided over by a single justice are held in each county. Cumberland and Kennebec counties have each a Superior Court presided over by a resident judge. Each county has a Probate Court and in most of the counties municipal courts have been established. Trial justices, in the various towns, have jurisdiction over local cases of minor importance.

Education. A superintendent of education appointed by the governor and confirmed by the council for three years is at the head of the school system. The township or city is the unit for local administration. Revenue is derived from a state school fund and local taxation. Textbooks, apparatus and supplies are free. Attendance between seven and fifteen years is compulsory. State normal schools are maintained at Castine, Farmington, Gorham, Presque Isle and Machias. The University of Maine at Orono is at the head of the educational system. Other institutions not under control of the state are Bowdoin College at Brunswick; Bates College at Lewiston; Colby College at Waterville; and Maine Wesleyan Seminary and Woman's College at Kent's Hill.

State Institutions. The hospitals for the insane are at Augusta and Bangor. There is a military and naval orphans' asylum at Bath. There is a United States soldiers' home at Togus. The Maine General Hospital and the United States Marine Hospital are at Portland. The Central Maine General Hospital is at Lewiston and the Eastern Maine General Hospital is at Bangor. The state prison is at Thomaston. The state school for boys is at South Portland and the industrial school for girls at Hallowell.

CITIES. The chief cities are Augusta, the capital; Auburn, Bangor, Bath, Biddeford, Lewiston, Rockland, Portland, Waterville and Westbrook. Old Orchard Beach and Bar Harbor are noted summer resorts.

HISTORY. Maine was probably visited by Norsemen as early as 996. Verrazano explored it in 1524, as did Hawkins in 1565, Gilbert in 1583, Gosnold in 1602 and John Smith in 1614. The first English settlement, at Sabins Point on the Kennebec, established in 1607 by Popham, was abandoned on account of the climate. Tracts in Maine being given to Gorges, Mason and other promoters, settlements were soon made at York, Pemaquid, Saco and other coast points. Most of these were destroyed by Indians. In 1677 Massachusetts purchased the Gorges' rights and in 1691 Maine was consolidated into "The Royal Province of Massachusetts Bay," to which it belonged until it entered the Union as a free state, 1820, to balance the admission of Missouri (See MISSOURI COMPROMISE). The Webster-Ashburton Treaty of 1842 settled the boundary dispute between Maine and New Brunswick. Since 1850 a heavy penalty has been placed on the manufacture or selling of intoxicants. The state furnished over 70,000 men during the Civil War.

GOVERNORS. William King, 1820; William Durkee Williamson, 1821; Benjamin Ames, 1821; Albion Keith Parris, 1822; Enoch Lincoln, 1827; Nathan Cutler, 1829; Jonathan G. Hunton, 1830; Samuel Emerson Smith, 1831; Robert Pinckney Dunlap, 1834; Edward Kent, 1838; John Fairfield, 1839; Edward Kent, 1841; John Fairfield, 1842; Edward Kavanagh, 1843; Hugh J. Anderson, 1844; John Winchester Dana, 1847; John Hubbard, 1850; William George Crosby, 1853; Anson Peaslee Morrill, 1855; Samuel Wells, 1856; Hannibal Hamlin, 1857; Joseph H. Williams, 1857; Lot Myrick Morrill, 1858; Israel Washburn, 1861; Abner Coburn, 1863; Samuel Cony, 1864; Joshua Lawrence Chamberlain, 1867; Sidney Perham, 1871; Nelson Dingley, 1874; Selden Connor, 1876; Alonzo Garcelon, 1879; Daniel F. Davis, 1880; Harris Merrill Plaisted, 1881; Frederick Robie, 1883; Joseph R. Bodwell, 1887; Sebastian S. Marble, 1887; Edwin C. Burleigh, 1889; Henry B. Cleaves, 1893; Llewellyn Powers, 1897; John Fremont Hill, 1901; William T. Cobb, 1905; Bert M. Fernald, 1909; Frederick W. Plaisted, 1911-1913; William T. Haines, 1913-1915; Oakley C. Curtis, 1915-1917; Carl E. Millicke, 1917-1921; F. H. Parkhurst, 1921—.

Maine, The, a United States battleship. Late in January, 1898, under Captain Sigsbee, it sailed to Havana, to all appearances on a visit, but in reality to safeguard American interests. A pilot of the Spanish Government led the *Maine* to anchorage; but on the night of Feb. 15, it was destroyed by a mysterious explosion, 266 of the crew perishing. The Sampson board of inquiry declared that the ship had been "destroyed by explosion of a submarine mine, which caused the partial explosion of two or more of her forward magazines." The cry "Remember the *Maine*" intensified the war spirit against Spain. The *Maine* lay in Havana Harbor, a menace to shipping, until the winter of 1912, when the hulk was raised, and by a remarkable feat of marine science, was made to float. Escorted by American warships, bearing the flag and decked with roses, it was towed into the Florida Straits, where it was sunk. With impressive ceremonies, the recovered remains of 34 victims of the disaster were buried in Arlington cemetery, Washington. The mainmast of the *Maine* was placed over their graves in memorial. Other intact features of the battleship were sent to various cemeteries and historical museums.

Maine, University of, at Orono (1865). This institution was first chartered as the State College of Agriculture and Mechanic Arts and was opened in 1868. In 1897 it took its present name. It comprises colleges of arts and sciences, agriculture, technology, pharmacy and law. The Maine Agricultural Experiment Station is a department of

the university. The law school is located at Bangor. Military instruction is required by law. The university is coeducational. The library contains over 45,000 volumes and the enrollment is about 900.

Mair, Charles (1840-), a Canadian poet, born in Ontario and educated at Queen's University. He early contributed prose and poetry to the press, and was a correspondent, at Ft. Garry, to the Montreal *Gazette,* for which he wrote a series of brilliant papers called *Canada in the Far West.* Conspicuous among his publications are *Tecumseh, a Drama,* the finest poetical drama in Canadian literature; *The Last Bison* and *Through the Mackenzie Basin.*

Majolica, *Ma jol' i ka,* a clay product or earthenware beautifully decorated in colors and with a lustrous, metallic enamel. The first examples came from the Island of Majorca (in Italian *Majolica*) in about the 15th century. Plates, bowls, vases, pitchers, bottles and flasks are the usual forms in which majolica products are made. See ENAMEL; POTTERY.

Ma'jor, a military officer ranking next below lieutenant-colonel and next above captain. The major has command of a battalion of infantry, field artillery, or engineers, or a squadron of cavalry. Each regiment of United States infantry and cavalry has three majors, one to each battalion or squadron. Members of staff in various departments and in the United States marine corps are frequently majors.

Major, Charles (1856-1913), an American novelist and lawyer, born in Indianapolis, Ind. He graduated at the University of Michigan in 1875, was admitted to the bar in 1877 and engaged in practicing law in Shelbyville, Ind. In 1885-6 he was a member of the Indiana Legislature. His historical novel of the days of Henry VIII, *When Knighthood Was in Flower,* published in 1898, became at once popular, and was very successfully dramatized. It was followed by *Dorothy Vernon of Haddon Hall, A Forest Hearth, A Gentle Knight of Old Brandenburg, The Little King* and *The Touchstone of Fortune.*

Major'ca, an island in the Mediterranean, a possession of Spain and the largest of the Balearic Isles. It is about 58 m. long and has an area of 1352 sq. m. Only the southern coast is low and contains a good harbor; the other shores are steep and rockbound. The fertile southern part of the island contains long stretches of vineyards; hemp, cereals, flax and various kinds of fruit are also grown. The coast fisheries are valuable, but the industrious Catalans are engaged chiefly in agricultural pursuits. Palma, the capital, is located on the southern coast. Population, nearly 250,000.

Malacca, *Ma lak' a.* See MALAY PENINSULA.

Malacca, Strait of, a body of water connecting the Bay of Bengal with the South China Sea and separating the Island of Sumatra from the Malay Peninsula. There are numerous islands in its southeastern part, on one of which is located Singapore, the British settlement. The strait is 500 m. long and has a maximum width of 250 m. in the northwestern extremity.

Malachi, *Mal' a ki,* the last book of the Old Testament; also the name of the reputed author of the book. As Malachi signifies "my messenger," some commentators consider that it is used in the opening verse in a literal sense and that the book is anonymous. *Malachi* consists of two divisions: (a) a general presentation of the main theme, followed by a rebuke to the priests; (b) a rebuke to the people for their unlawful marriages with the Gentiles, and exhortations to repentance. The book was written during the Persian period, in the fourth century B. C. See BIBLE, subhead *The Old Testament.*

Malachite, *Mal' a kite,* a native basic carbonate of copper, commonly occurring massive, though sometimes fibrous and in the form of icicles. It is usually partially transparent, bright green in color, takes a high polish and has a bright luster. The massive variety is valuable for gems and for table tops, clock cases,

inlay work and similar ornamental purposes. Fibrous malachite, when finely ground and mixed with proper ingredients, serves as paint. A fine quality of malachite is found in the Ural Mountains and in Arizona, and Montana, and the mineral also occurs in France and Russia.

Málaga, *Mah' lah gah,* a seaport of southern Spain, capital of the province of the same name, situated on the Mediterranean coast. Several Moorish ruins remain, in the midst of handsome, modern buildings. The chief industrial establishments are iron foundries, cotton mills, engineering works, tanneries and manufactories of sugar, soap, candles and paper. The climate is mild and the view from the sea suggests the beauty of Naples. Population in 1900, 130,109.

Mala'ria, a term sometimes applied to effluvia of marshes and swampy lands arising from decomposition of animal or vegetable matter; but more often to the unhealthy condition of the body, caused by this poison and manifested by chills and fevers. Until recent times the disease was believed to be the result of inhaling the miasmic air of such regions; but in 1880 a French army surgeon, named Laveran, discovered the microscopic parasite in the blood, which subsequent investigation proved to be the malaria bacillus. The germ is commonly carried by certain species of mosquito, but may also enter the system through drinking water contaminated with the germs. The disease sometimes does not manifest itself until 12 months after exposure, and often leaves a depressing influence which lasts through life. The chills and fever are intermittent and regular, occurring from one to four days apart. A certain amount of immunity may be acquired by the use of quinine. From five to ten grains may be taken once or twice a week or every morning before breakfast. See MOSQUITO.

Malay' Archipelago, Indian Archipelago or **Malaysia,** *Ma la' shi a,* a group of islands lying southeast of Asia and separating the Indian Ocean on the west from the Pacific on the east. This great archipelago, the most extensive on the globe, includes such well-known islands as Borneo, Sumatra, Java, Celebes and New Guinea, and such groups as the Philippines, the Moluccas and the Sundas, besides a long chain of lesser islands. Politically the islands belong to different nations. By far the greater number are under the dominion of Netherlands; the Philippines belong to the United States; Penang, Singapore, Labuan and a part of Borneo and of New Guinea belong to Great Britain, while several of the smaller islands are Portuguese. The inhabitants of the islands are of two races, the Malay and the Papuan, the latter being the inferior race. Their homes are bamboo structures built partly over the water; their chief pursuits are trading in fruits and constructing boats.

Malay' Peninsula, or **Malacca,** *Ma lak' a,* a long, narrow peninsula of southeastern Asia extending for about 850 m. toward Sumatra. Its width varies from 50 to 210 m. and its area is 90,000 sq. m. Two parallel mountain ranges extend lengthwise through the peninsula and are covered with immense forests of valuable trees, such as sandalwood, teak, camphor, cinnamon, palms, ebony, rattan, etc. Wild animals and birds of brilliant plumage make their homes in the wooded slopes. Metals are also abundant in the mountains, and over one-half of the world's supply of tin is obtained here. Gold, silver, iron and coal are also mined. Upon the fertile plains at each side of the mountain ranges, rice, pepper, cotton, sugar cane, areca nuts, tobacco, coffee, tea, tapioca, cocoa and yams are cultivated. The peninsula is also noted for its export of gums. The inhabitants are of different races, being chiefly Malays, Siamese, Negritos and Chinese; in numbers there are from one to two million people. Politically the peninsula is partly British and partly Siamese.

Malden, Mass., a city of Middlesex Co., 5 m. n. of Boston, of which city it is a suburb, on the Malden River and

on the Boston & Maine and other railroads. Interurban lines connect with Boston, Haverhill, Salem, Lynn, Lowell and other towns and cities. A number of villages are included within the corporate limits of the town. A fine system of parks is maintained, Pine Banks being the best known. The Middlesex Fells, a state reservation, lies to the north and west of Malden. Among the public buildings are a city hospital, home for aged persons, public library, endowed by Elisha S. Converse, and a day nursery. Malden has important manufacturing interests, the most valuable manufactured products being rubber boots and shoes, sand and emery paper, lasts, glue, cords and tassels, boot-trees, wire cord, knit goods, furniture, picture moldings, cotton goods, soap, cordage, carpets and paper. Malden was settled in 1641 and was a part of Charlestown until 1649. A city charter was granted in 1881. Population in 1920, U. S. census, 49,103.

Mal'dive Islands, a group of many small coral islands of the Indian Ocean, lying between 200 and 300 m. s.w. of India. They are arranged in 17 groups all protected by barrier reefs. Fishing is an important pursuit, and on the larger islands, where the soil is fertile, fruits, millet, coir and coconuts are raised. The islands are ruled by a native sultan, but they are British possessions and form a part of the Ceylon Government. The inhabitants are chiefly Mohammedans and number about 50,000.

Malice, *Mal' is,* in law, an intention to injure the person or property of another. It is usually termed *malice aforethought.* When the act consists in doing damage to public or private property out of a spirit of wanton cruelty or revenge, it is termed *malicious mischief* and the perpetrator is liable to severe punishment. Malicious intent is presupposed in the commission of the act, and the burden of proving the contrary rests with the accused.

Mal'lard, a bird of the Duck and Goose Family, and the best known of the American game birds. Its iridescent-green head and neck, chestnut-brown chest with white collar, gray sides and under parts, black rump and tail coverts, and changeable green, black-bordered wing feathers easily distinguish the handsome male. The female is mottled with buff and dark gray, a plumage well suited to render her inconspicuous while incubating the six to ten pale greenish eggs, laid in a grass-made, down-lined nest, hidden on the ground. In the fall these ducks feed on wild rice, as well as seed and grain, and become very fat, offering a tempting target for the sportsman. The mallard breeds from the southern part of the United States to Alaska, and winters in Panama.

Mal"leabil'ity, that property of matter by virtue of which it is capable of being hammered or rolled into thin sheets. Metals are the only substances that are malleable to any extent, the most malleable being, in order, gold, silver, copper, platinum, iron, aluminum, tin, zinc and lead. See GOLD BEATING.

Mal'lory, Stephen Russell (1813-1873), secretary of the Confederate navy, born at Trinidad, in the West Indies. He was appointed inspector of customs at Key West in 1832, was admitted to the bar in 1839, served in the Seminole wars in Florida and became United States senator in 1851. He held this position until 1861, when he became secretary of the navy for the Southern Confederacy. After the war he resumed his law practice.

Mal'low, herbs and shrubs of the Mallow Family, best known through their common representative, the round-leaved mallow of fields and roadsides. This mallow is a low herb, which was brought from Arabia to be used in the preparation of ointments. In the United States it has escaped from gardens and, though not especially troublesome, is called a weed. The stems are bent along the ground, and often extend for several feet from the parent root, which is deep and tough. The leaves are kidney-shaped, with rounding lobes and wavy margins. The flowers are white, lined with rose or pink, and the five petals are blunt-pointed and spreading. In the cen-

ter stands an erect tube, from which the stamens protrude. The fruit is flat and circular, marked by radiating lines, which show that it is formed from many united pods, which when ripe fall away separately. These fruits are the "cheeses" sought for by the children and eaten with delight, though they are practically tasteless. All of the mallows contain mucilaginous substance and when young are thickly covered with soft, downy hairs.

Some of the other well-known mallows are: the three-lobed mallow, a European

MALLOW

mallow with large, white or rose-colored flowers, cultivated as a garden plant; the marsh mallow, an Eastern plant, somewhat coarser than the above, from the root of which mucilage and marsh mallow paste are made; the tree mallow, a woody plant which grows from two to six feet in height and has pale purple flowers; and the rose mallow, a favorite ornamental shrub.

Mal'ory, Sir Thomas, an English author, living during the 15th century. Little is known of his life. He compiled the Arthurian romances (it is uncertain from what source), and in his translations added charm and dignity to the stories through his manly, earnest style, and the moral strength with which he has imbued them. Tennyson made use of Malory's *Morte d' Arthur* for his *Idylls of the King.* See TENNYSON, ALFRED.

Malta, *Mol' ta,* an island in the Mediterranean Sea, lying between Tripoli and Sicily. It is a British possession and is a part of the Maltese group including Comino, Gozo and other islands. A mild and healthful climate prevails except when the *sirocco,* a hot desert wind, blows from the Sahara. The fertile soil yields two or three yearly crops and the principal products are honey, figs, oranges, cotton, olives, potatoes and corn. Lace, cotton goods, lucifer matches and filigree are manufactured. The educational facilities are good. Malta has long been used as a port of call, and Valetta, the capital, has one of the best harbors in the world. Population in 1901, including the garrison and navy, 207,890.

Mal'thus, Thomas Robert (1766-1834), an English economist, educated at Cambridge University. In 1798 he published his *Essay on the Principle of Population as It Affects the Future Improvement of Society,* the main idea of this work being that population tends to outgrow means of sustenance. From 1807 until his death he served as professor of political economy at the East India Company's College at Haileybury. The doctrine of Malthus as stated in his essay has had tremendous influence on economic thought, and suggested to Darwin the influence of the struggle for existence upon progress.

Malting. See BREWING.

Mal'vern Hill, Battle of, an engagement of the Civil War, fought in Virginia, at Malvern Hill, near the James River, July 1, 1862. Eighty thousand Federals of the Army of the Potomac, under McClellan, had a very strong position on the hill and had the further advantage of support from gunboats on the river. Though Lee had an equal army, the bayonet charge which he had ordered all along his line failed, and

when the battle ceased, after dark, not a line or column of the Federals had been broken, while each Confederate advance had been forced back and every battery had been disabled. The Confederates lost over 5000 men; the Federals less than one-third as many. This was the last of the "Seven Days' Battles," ending the Peninsula Campaign, and Lee withdrew to Richmond.

Mamma'lia, the highest group of animals and a member of the Vertebrate division, which also includes birds, reptiles, frogs and fishes. The Mammals differ from the other groups by three chief characteristics: the young are nourished by a sweetened milk secreted by the mother's glands; the body is more or less coated with hair, a protective covering assumed by no other group of animals; and all are warm-blooded. Mammals are by far the most important of the animals, for not only does the class include man but it also embraces those animals which assist him in his labors, and furnish his bedding and clothing, much of his food and even his domestic pets. They are distributed over all parts of the earth and comprise 14 principal families. The chief groups are: the Primates, a class including man and the monkeys; the Insectivora, or insect-eating animals; the Carnivora, or flesh-eating; the Ungulata, or hoofed; the Rodentia, or gnawers; and the Marsupialia, or pouched. All of these are treated under their respective titles, and an outline of the entire group may be found in the article Zoology, subhead *Classification.*

Mam'moth, a recently extinct elephant closely related to the existing Asiatic elephant. It lived in the temperate parts of the Northern Hemisphere during the glacial period, moving northward with the receding ice and surviving until some time after the appearance of man. An abundance of mammoth fossils have been found in the regions bordering on the North Sea and in northern Asia, where they have been incased in the ice thousands of years. Toward the close of the 18th century an entire carcass, which had been frozen into an ice cliff on the north coast of Siberia, was discovered in a state of such perfect preservation that the flesh served as food for animals. Other remains have been found from which several specimens have been reconstructed for natural history museums. The reconstructed figure closely resembles that of the elephant of the present time. The tusks of the mammoth were more curved than those of the elephant, and the body was covered with a dense coat of reddish fur interspersed with straight, black hairs. The average size was little above that of the elephant, though gigantic specimens have been found. A pair of tusks discovered in Alaska measure 12¾ ft. in length. One of the largest mammoth specimens is owned by the Field Museum of Natural History, Chicago.

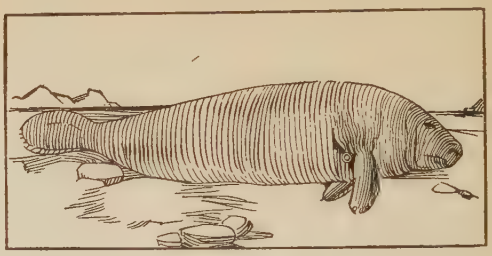
Mammoth Cave, the largest-known cavern in the world, situated in Edmonson County, Ky. The cave, discovered by a hunter in 1809, consists of numerous limestone caverns, which have been explored for several miles. The largest chamber, called the Chief City, is 450 ft. long and 130 ft. wide. Other large chambers are the Mammoth, Gorin's and the Stella, all with dome-shaped roofs and each about 250 ft. in height; the Lucy Dome is 300 ft. high. In all the passages beautiful stalactites and stalagmites occur in fantastic forms resembling natural objects and architectural designs; while lakes, rivers, waterfalls and fountains enhance the beauty of the subterranean scenery. By the use of artificial lights enchanting effects are produced in certain parts, as in the Star Chamber, which, when illuminated, appears to be studded with innumerable points of light. The cavern contains several streams, the largest of which is Echo River, which is nearly a mile in length and which flows into Green River. Another river, the Styx, is spanned at one point by a natural bridge of singular beauty. Numerous blind fish, blind grasshoppers and other insects are found in the cave. The Mammoth Cave is one of a series of limestone caverns under-

lying about 8000 sq. m. of territory in Tennessee and Kentucky. Their formation is due to the disintegrating effects of water.

Man, the most highly developed member of the animal kingdom. There have been many different views concerning man's place in the animal kingdom, but leading authorities now agree in placing him in the order Primates, which also includes apes and monkeys. Man differs from the ape, however, in the following particulars: 1. The spinal column has a double curve, which enables him to maintain an erect position. 2. Man uses his arms only for holding objects, whereas the ape uses them for locomotion. 3. The skull is more nearly balanced on the line of the spinal cord, and the forward projection of the nose and chin common in apes is lacking in man. 4. Man has a relatively larger brain than any other member of the animal kingdom. 5. In intelligence man so far exceeds all other beings on earth as to place him in a class by himself.

There have been many theories concerning the origin of man. Darwin and his school believe man to have been developed from the monkey and ape through a long period of evolution. Others believe that both man and the ape descended from a common ancestor of which no trace now remains, and still others believe him to be a distinct creation. See ANTHROPOLOGY; ETHNOLOGY.

Man"atee', or **Sea Cow,** a family of lake and ocean Mammals somewhat resembling seals and whales in habit. There are few species and comparatively few representatives of each class. All have rounding heads, nearly hairless bodies and flattened, paddlelike or forked tails. The hind limbs have entirely disappeared and the forelimbs have webbed coverings which, in the species also known as the manatee, have nails at their extremities. This particular species has a divided upper lip which aids in the mastication of its food, and many teeth which continue to increase in number throughout the animal's life. The manatee was once common along the coasts of Florida and the Gulf States but has been rendered scarce because its flesh and oil are highly valued. A separate species is found in the Orinoco River. See DUGONG.



MANATEE

Man'chester, a city, civic county, municipal and Parliamentary borough of Lancashire, England, situated on the Irwell River, 31 m. n.e. of Liverpool and 189 m. n.w. of London. The city lies on a level plain, and the residences are principally of brick made from clay, dug out of the fields on which the houses have been built. Terra cotta is used more and more for the large warehouses, many of which possess distinct architectural merit.

The buildings embrace the Cathedral, or Old Church, the Church of the Holy Name, St. John's Catholic Cathedral, the Cavendish Independent Church, the Royal Institution, or art gallery, the Royal Infirmary, the Royal Exchange, the Gothic Town Hall, the Free Trade Hall, the Assize Courts, the Athenæum, the Victoria University, Chetham's Hospital and an art gallery. The Town Hall is among the largest municipal buildings in the country and is distinguished for its Gothic architecture, its magnificent organ and its tower overlooking the vicinity as far as the hills of Derbyshire and containing the famous peal of bells. The educational facilities are good and the libraries are numerous. The parks number 39 and cover 1103 acres. Several bathing establishments have been opened. The city owns and leases a large number of tenements and cares for the housing conditions of the working classes.

Cotton spinning, weaving and manufacturing are the chief industries, and

after the introduction of machinery at the end of the 18th century the industrial development was extraordinary. Among other gigantic manufactures are woolens, silks, chemicals, machinery and miscellaneous articles of almost every variety. The Manchester Ship Canal, completed in 1894 at an expense of $75,000,000, affords direct communication with the sea and entrance to the very heart of the city and of the largest steamers. See CANAL.

There are evidences that Manchester was once occupied by the Romans, but nothing is definitely known until the Anglo-Saxon Period. The Danes invaded it in the tenth century. By the 14th century it was a thriving town, and its recent commercial and industrial growth has been very rapid. It became the headquarters of the free-trade movement after 1832, and to it the Manchester School of Economy owes its name. Population in 1919, 731,830; including Salford, 862,699.

Manchester, Conn., a town of Hartford Co., 9 m. e. of Hartford, on the Hockanum River and on the New York, New Haven & Hartford Railroad. The villages of Highland Park, South Manchester, Buckland, Manchester Green and Manchester are comprised within the corporate limits of the town. The chief industrial establishments include paper, silk, cotton and woolen mills, gingham and stockinet factories, needle works and electrical-supply and soap works. A large amount of tinware is made here. There are public libraries in the villages of South Manchester and Manchester. Until 1823, when the town was incorporated as Manchester, it formed a part of East Hartford. Population in 1920 U. S. census, 18,370.

Manchester, N. H., the largest city of the state and one of the county seats of Hillsboro Co., 17 m. s. of Concord, the state capital, and 53 m. n. of Boston, on the Merrimac River at the mouth of the Piscataquog, on five branches of the Boston & Maine Railroad and on interurban electric lines. It occupies the well-drained slopes of both river banks. The Amoskeag Falls in the Merrimac above the city provide extensive water power.

The city is attractively laid out, with broad, well-lighted and shaded streets, and has numerous well-kept public parks. One of them has a monument to Gen. John Stark, who resided here. Manchester contains a government building, a state industrial school, the Gale Home for Aged Women, St. Joseph's and St. Patrick's orphanages, St. Anselm's College, the Elliot, Sacred Heart, Notre Dame and Lady of Lourdes hospitals, and a fine public library. The Institute of Arts and Sciences provides classes and lecture courses in science, music and art. The most extensive industry is the manufacture of cotton goods, which is conducted on a vast scale. Other manufactures include boots and shoes, cigars, woolen and knit goods, wagons, carriages, hosiery, paper, leather, locomotives, machinery, needles, knitting machines, wooden goods and seamless bags. Manchester ranks fifth among the cities of the United States in cotton manufacturing and also fifth in the manufacture of boots and shoes. The water supply, the schools, and the fire and police departments, street-railway and electrical service are of the best.

Amoskeag Falls and vicinity formed a favorite resort of the Pennacook Indians, and it is said that John Eliot, the "apostle to the Indians," preached to them here in 1651. The first white settlement was made by Scotch-Irish immigrants, a few years previous to 1722, when a charter was obtained. In 1751 the territory known as Tyng's Township, or Harrytown, was incorporated as a township. In 1810 the name was changed to Manchester, the name being suggested by the manufacturing possibilities of the place. During the years from 1794 to 1807 a canal was built around the Amoskeag Falls through which to carry lumber. The villages of Amoskeag and Piscataquog were annexed in 1853. Manchester received a city charter in 1846. Population in 1920, U. S. census, 78,200.

Manchester Canal, a canal in England, 35.5 m. in length, through which ocean-going ships can pass from Liverpool to Manchester. More than 100 acres of docks, 6 m. of wharfage and 30 m. of railroad sidings have been constructed along the canal for the accommodation of foreign commerce. This is a lock canal considerably wider than the Suez Canal and two-thirds as long as the one at Panama. It is 120 ft. wide and 26 ft. deep, and cost approximately $75,000,000, one-third of which was paid by the city of Manchester. It was opened for traffic on Jan. 1, 1894, and formally opened on May 21 of the same year by Queen Victoria.

Manchuria, *Man choo' ri a,* a dependency of China lying between Siberia and Korea and bordering upon Mongolia on the west. Its northern boundary is outlined by the Amur and Argun rivers, while the Yalu separates it from Korea upon the south. In general, the country is mountainous and there are large forests of pine, oak, elm and walnut. Gold and coal are mined in increasing quantities. In the northern part are the steppe regions, and the most of the cereals of China are raised here; millet, wheat, barley, rice, corn, beans, peas, potatoes, tobacco, rhubarb, ginseng, cotton and hemp are among the most valued crops. Fur-bearing animals abound in the mountains where the climate is severe in the winter.

Manchuria has an area of about 360,000 sq. m. The inhabitants are chiefly Chinese. From the middle of the 17th century up to the formation of the republic a Manchu dynasty ruled China, and their language was the language of court. At present Manchuria is governed by a governor-general appointed by the Chinese Government. His official residence is at Mukden. The population of Manchuria based upon the Chinese household census is 16,000,000.

Man'dalay, a city of India, the former capital of Burma, situated on the Irrawaddy River, 350 m. n. of Rangoon. The streets are well lighted and are shaded by handsome avenues of trees. Among the buildings are various monasteries, pagodas, the government house, the hall of justice and the palace. There are some 20 bazaars containing a miscellany of collected wares. Silk weaving is the important industry. Population in 1901, 183,816.

Man'dan, a tribe of Indians, formerly living in what is now North Dakota. They constructed circular dwellings with dome-shaped roofs, which they made by stretching buffalo skins over a framework of poles. They were noted for their bravery and clean habits of life. The Mandans were decimated by smallpox and finally driven from their country by the Sioux. Only a few remain and they are on a reservation.

Mandate Rule. The Treaty of Versailles recognized that a number of colonies and territories, formerly under the government of Germany, Austria-Hungary, and Turkey had ceased to be so governed. But in many cases they were inhabited by people not fitted for full self-government; or they were so situated that they needed the protection of the League of Nations.

To meet such needs, the treaty provides that more advanced, more stable, or more powerful nations should be given a mandate, or commission, to supervise the government of such dependent colonies or territories. But in each case the degree of authority, control, or administration exercised by the mandatory nation is agreed to by the League of Nations, and the mandatory powers make annual reports to the League giving details of their administration.

Man'deville, The Travels of Sir John, the title of a famous collection of marvels and adventures, composed in the latter part of the 14th century. The author in the book states that he is one John Mandeville, born at St. Albans, who in 1322 traveled through Tartary, Persia, Armenia, Africa, Chaldea, Ethiopia, Amazonia and India. He adds that the book was first written in Latin, then turned into French and English. These statements are no longer accepted as

true. It is probable that the French version (1371) is the oldest, and that from this one the others were derived, early in the 15th century. The work is mainly a compilation from the travels of various other itineraries, though the writer may have traveled in the East. This writer is supposed to be one John of Burgoyne with the Beard, who died at Liege in 1372. There are three English versions of the work extant.

Man'dolin, a musical instrument of the string type. It has a shell-shaped body made of thin pieces of wood glued together, a finger board and neck resembling those of a guitar, and a sounding board. The best mandolins have eight strings. The instrument is played by striking the strings with a small piece of tortoise shell or celluloid. It cannot sustain a long note, so is played as a tremolo.

Man'drake, a noticeable plant of the Barberry Family, which grows in moist

MANDRAKE

woodlands and often strays into meadows, where it attracts attention because of its large, flat leaves, which seem to make a raised floor from 12 to 20 inches above the ground. These leaves, of which there are but two, are light green, with a paler spot where the stem joins the leaf. The flowers are single, drooping blossoms, growing in the fork of the stem. They have creamy-white, separate petals and many yellow stamens surrounding a fleshy pistil. The flowers have a heavy odor, which becomes unpleasant as the flower grows older. The fruit is a large lemon-shaped berry having many seeds and a sweet, insipid taste.

The plant has many names given from its fruit and leaves; wild lemon, May apple, duck's foot and umbrella plant. The root, which is thickened and horizontal, is used in medicine but is an active poison in its natural state.

Man'drill, a baboon of the African forests, noted for its peculiar coloring. The body and limbs are covered with gray or brownish hair, but the nose is naked and swollen at the sides, where it is marked with lines and ridges of blue, black, pink or purple. The hinder portion, which is tailless and callous, also presents the same striking coloration, although red predominates. These gaudy colors are a matter of great pride to the mandrill, and it loves to admire its charms in a mirror. The limbs of the mandrill are long and stout, and it generally travels on all fours, although its favorite attitude is a resting position upon its haunches, with its "arms" across its knees and a bored expression upon its face. See BABOON.

Man"ganese,' a metal, widely distributed in nature and occurring as an ore in various parts of the United States and in Brazil and Russia. It is present in some mineral waters and food plants, and is a constituent of the atmosphere of the sun, occurring always in combination with other elements. It forms numerous oxides, important among which is manganese dioxide, or peroxide, a black powder used largely in the manufacture of chlorine, in making glass and black enamel for pottery and in the preparation of oxygen. Potassium permanganate, a compound of manganese, oxygen and potassium, is a strong oxygenizing agent, and for this reason is valuable in the useful arts and in chemistry and medicine. The metal is obtained by reducing any of its oxides with carbon or by heating manganese

chloride with metallic sodium. Pure manganese is gray in color, hard and brittle, with a reddish luster, and takes a high polish. It resembles iron, both physically and chemically, but is not magnetic. The metal is of no use by itself, but is valuable as an alloy of iron, copper, aluminum and mercury. As an alloy of iron it goes by the names *spiegeleisen* and *ferromanganese,* and is used extensively in the manufacture of steel. The manganese of commerce is commonly a mixture of its dioxides, not the metal itself.

Mange, *Manje,* a contagious skin disease of cattle, dogs or other domestic animals, caused by a small tick that burrows beneath the skin. The irritation causes the animal great suffering and produces a scabby skin. Animals infested should be bathed or dipped frequently in carbolic-acid solutions or treated with tobacco and sulphur sprays. Farmers having infected animals should take great care that the disease is not allowed to spread.

Man'go, a tropical tree, botanically related to poison sumac, and, with it, belonging to the Cashew Family. It is a tall, handsome tree with a large trunk which divides about 10 ft. from the ground and spreads in long branches to a length of 40 to 50 ft. These branches are thickly covered with long, leathery, evergreen leaves, which form a dense shade. The wood is soft and is employed in canoe building and light construction work. The flowers appear in long, thick clusters at the end of the branch, and are small pink or yellow blossoms.

The fruit, for which the mango is perhaps chiefly known, is a smooth, melon-shaped stone fruit, resembling the plum and containing one long, flat seed. In the better varieties it is juicy and sweet, but in the poorer kinds is dry and fibrous and has a decided taste of turpentine. The unripe fruit is used in making preserves, jellies and pies, much relished by the inhabitants of southeastern Asia, where the tree is native. The seed, in times of scanty crops of grain, has been used as a food. The mango was introduced into the East Indies late in the 18th century and has been grown with some success in southern and in western United States. It is not, however, a wholly popular fruit, except in the improved form known as the mangosteen.

Man'grove, a tropical tree of the Mangrove Family, peculiar from its manner of growth. The stems and branches have the power of sending out roots which extend down to the mud of the swampy shores upon which the tree grows, thus forming a close thicket. The globular seeds germinate while still on the tree and send out long, paddlelike shoots, which finally break the seeds from the parent stem; the seed end is the heavier, and, in falling, is buried deeply in the mud, leaving the half-grown stem emerging from the ooze and well begun in its growth. The leaves are large and leathery, the fruit is sweet and agreeable to the taste, and the wood is useful in boat building. Mangroves grow abundantly in southern Florida and on the Florida Keys.

Manhat'tan Island. See NEW YORK, CITY OF.

Manil'a, the chief city and the capital of the Philippine Islands, situated on the west shore of the Island of Luzon, at the head of Manila Bay and the mouth of the Pasig River. The old city, or walled city, is on the south side of the river. It is surrounded on two sides with a wall, which is encircled with a moat that in time of war can be filled with water from the sea. This part of the city is distinctly Spanish in its architecture and general appearance. The Cathedral, the government building and other prominent public buildings are located in this part of the city. On the opposite side of the river is Binondo, the modern city, which is the center of the commercial and industrial activity. Throughout the city the streets are straight and lighted by electricity. A few of them are paved and the others are macadamized. San Miguel, on an island in the river, is the fashionable

suburb. The river is crossed by several bridges. There are several public squares, and the Luneta is a favorite promenade. In the Plaza de Magallanes is an obelisk to the memory of Magellan.

Making cigars and cheroots is the leading manufacturing industry. Other important industries include the manufacture of products of Manila hemp, textiles and machinery and castings. Manila is on an excellent harbor and is the chief commercial center for the Philippines. It carries on a large trade with Great Britain, China and the United States. The chief exports are sugar, hemp, tobacco and cigars, coffee and dye goods.

The educational and charitable institutions include the University of the Philippines, established in 1911, St. Thomas University, a normal school, an athenæum, an observatory and several hospitals. Public education is in charge of the government, and the schools are patterned after those in the United States. The population is about 220,000, more than one-half of whom are Filipinos. There are about 21,000 Chinese and approximately 5000 Americans.

Manila, or **Abaca,** *Ah" bah kah',* a large herblike plant of the Banana Family, cultivated in the Philippines for its valuable fiber, used in making cordage and sailcloth. The stem, which is covered by the overlapping sheaths of the stemless leaves, is straight and grows to a height of from 8 to 20 ft. The plant reaches maturity in three to five years and is cut down when the first flower bud appears. The fiber is separated from the pulp of the leaves by machinery, then is washed, dried and bleached. On account of its hardness and strength Manila fiber is used in making binding twine, hawsers and cables.

Manila Bay, Battle of, the first notable battle of the Spanish-American War, fought in Manila Bay, in the Philippine Islands, May 1, 1898. Commodore George Dewey commanded an American fleet of nine vessels; the Spanish fleet consisted of ten vessels and was, besides, largely supported by shore batteries. Having been ordered from Chinese waters, the American fleet sailed past the Spanish cannon at the mouth of Manila Bay, on the night of Apr. 30, and early the following morning made a terrific attack on the Spanish fleet in the harbor, which by one o'clock was totally destroyed. Moreover, the batteries were silenced. Six Americans were wounded; the Spaniards lost over 600 killed or wounded.

Man, Isle of, an island in the Irish Sea, deriving its name from the fact that it lies almost equidistant from England and Ireland. Its length is 32 m., its width, 12 m. and its area, 220 sq. m. The surface is undulating, and a mountain chain extending the length of the island culminates in Snaefell, at a height of 2034 ft. above sea level. There are rich mineral deposits, principally of lead, iron, copper and zinc. The climate is remarkably even and the range of temperature throughout the year is very limited. Fishing is an important industry, and cattle and sheep range the pastures. The inhabitants, the Manx, are of Celtic origin, and their native, or Manx, language is a dialect of the Celtic. Between the sixth and the ninth centuries the island was ruled by Welsh kings. Later, the Norwegians and Danes held possession; in 1290 the Manx voluntarily placed themselves under the protection of the English, and near the end of the 18th century the British Government purchased the sovereignty of the island. Population, about 55,000.

Man"istee', Mich., a city and the county seat of Manistee Co., about 114 m. n.w. of Grand Rapids, on the Manistee River, which flows between Manistee Lake and Lake Michigan and which here broadens out into a small lake. Transportation facilities are supplied by the Pere Marquette, the Manistee & Northwestern, the Manistee & Luther, the Manistee & Grand Rapids and other railroads, and by steamboat lines connecting with Chicago, Milwaukee and other lake ports. The town is one of

the most important shipping ports on Lake Michigan. The principal industries are the manufacture of salt and of lumber. Underlying the town is one of the largest deposits of rock salt in the world. There are also manufactories of shingles, furniture and sole leather. Manistee has a county normal school, a school for the deaf and dumb, a business college and a Carnegie library building, and owns and maintains Orchard Beach, a beautiful bathing resort about two and one-half miles distant. At Filer City, a few miles southeast of Manistee, are the largest salt works in the world. The first permanent settlement of Manistee was made in 1841; the town was chartered in 1869. Population in 1920, 9,690.

Man"ito'ba, a province of the Dominion of Canada, bounded on the n. by the North West Territories, on the e. by Hudson Bay and Ontario, on the s. by the United States and on the w. by Saskatchewan. Its length from north to south is 725 m. Its breadth varies from 270 m. in the south to about 500 m. in the widest part; the area is 252,000 sq. m. In 1912 the District of Keewatin was divided between Manitoba and Ontario, thus adding to Manitoba an area about two and one-half times its original size and making it a little larger than Saskatchewan and about the size of Alberta. It lies practically in the center of the land mass of the Continent of North America, and is midway between the eastern and western extremities of the Dominion. Population in 1911, 455,614.

Surface. The southern part of the province is included in the Valley of the Red River of the North and is a part of the bottom of Lake Agassiz, a large lake covering this part of the country in past geological ages. The region is a broad level plain. The eastern part of the province is in the Laurentian Plateau region, and is broken and hilly, well wooded and has many lakes. In the western part there is an escarpment with an altitude of 500 ft. This continues in a northwestward direction under the names of Pembina Mountain, Riding Duck and Porcupine mountains. This escarpment occupies all of the southwestern part of the province.

Rivers and Lakes. Manitoba is well supplied with lakes. Lake Winnipeg, Lake Winnipegosis and Lake Manitoba are in the central and northern parts. Lake Winnipeg is 270 m. long and has an area of 9400 sq. m.; Lake Winnipegosis has an area of 2030 sq. m.; Lake Manitoba, 1900 sq. m. The greater part of lakes Winnipeg and Winnipegosis is in Manitoba. There are also a number of smaller lakes. The Red River of the North and its tributary, the Assiniboine, drain the southern part of the province into Lake Winnipeg. The Pigeon, the Leaf and the Poplar rivers are in the northeastern part, and the Swan is the principal stream in the northwestern part.

Climate. The winters are cold and dry, with usually a considerable fall of snow. The summers are warm and pleasant. The dryness of the atmosphere prevents the extremes of temperature from being felt, as they are in localities where the atmosphere is charged with humidity. Throughout the year the climate is bracing and healthful. The rainfall averages 17 inches, the greater part of which occurs in early summer, so that the moisture is ample for agriculture.

Agriculture. Agriculture is the chief industry and gives occupation to the greater part of the inhabitants.

Crops. The soil and climate are suited to the growth of wheat, oats, barley, flax, potatoes and vegetables. Small fruits and, in some sections, apples are successful. Wheat is the chief crop in value and extensive areas are devoted to its culture. The soil and climate are such as to produce a grain of the highest grade, and Manitoba wheat is eagerly sought in foreign markets. Other grains in order of importance are oats and barley.

Live Stock. The country is well suited to live stock, and large numbers of horses, cattle, sheep and hogs are raised. Poultry is also an important source of income, nearly a million chickens, turkeys and geese being sold yearly.

Dairying has also become an important branch of the live-stock industry, the yearly income from dairying products being about $1,790,000.

Statistics. The leading products in 1917 were as follows:

CROPS

	Bushels
Wheat	41,039,700
Oats	45,375,000
Barley	15,930,000
Flax, rye and peas	1,387,779
Potatoes	3,643,000

LIVE STOCK

Horses	384,772
Milch cows	225,659
Other cattle	521,240
Sheep	136,782
Hogs	284,596

MANUFACTURES. Spruces, cedar, cottonwood and tamarack occur along the eastern border, and there are dense forests of white pine in the northwest. Lumbering is the most important manufacturing industry, but the product of the mills is practically all used within the province. The manufacture of flour is next in importance; then follow the manufacture of railway supplies and of machinery. In 1915 Manitoba had over 499 manufacturing establishments and the total value of their output exceeded $60,481,446. Manufactures are yearly increasing in number and extent. Winnipeg is the leading manufacturing center.

TRANSPORTATION AND COMMUNICATION. The Canadian Pacific, the Grand Trunk Pacific and the Canadian Northern railways cross the province from east to west. Each of these lines has numerous branches extending in various directions, and the Great Northern and other systems enter the province from the United States, so that the settled portions of Manitoba are well supplied with railway facilities. The Canadian Northern has extended a branch into the Swan River country, and other branch lines are being built as fast as the development of the province requires. Regular mails reach all localities, and the telegraph and telephone are found in all communities.

GOVERNMENT. The chief executive is the lieutenant-governor, who is appointed by the governor-general of Canada for a term of five years. He is assisted by an advisory council appointed by himself and consisting of heads of departments of the provincial government. The Legislature consists of an Assembly of 40 members. The provincial government is supreme in all matters pertaining solely to the province, provided their acts conform to the constitution and the laws of the Dominion. The judges of the courts are appointed by the Dominion Parliament for life.

EDUCATION. Manitoba has an excellent system of public schools. Attendance is compulsory. The 16th section of land in every township is set apart as school land, from which a school fund is created. There are graded and high schools in all the cities and larger towns. There are a provincial university, a provincial normal school and a provincial agricultural college at Winnipeg.

CITIES. The chief cities are Winnipeg, the capital; Brandon and Portage la Prairie.

HISTORY. Manitoba formerly belonged to the Hudson's Bay Company and was purchased by the Dominion Government in 1869. The first English settlement within the province was made in 1812 by a company of Scotchmen under Lord Selkirk. The early history of the territory was characterized by frequent conflicts between the Hudson's Bay Company and the North West Fur Company, until finally the Hudson's Bay Company purchased the rights of the other. After the purchase of the territory by the Dominion, the French half-breeds and some Indians started a rebellion under the leadership of Louis Riel, the chief cause being dissatisfaction over land claims. The rebellion was summarily put down and Riel fled to the United States. In 1873 Manitoba became a province of the Dominion of Canada. The completion of the

Canadian Pacific to the province opened this fertile region to settlement, and immigrants began to arrive in large numbers. In 1884 Riel returned and fomented a second rebellion, which caused the loss of several lives. He was captured and later tried and executed for treason. Since the beginning of the 20th century the province has developed rapidly.

Manitoba Lake, situated in about the central part of Manitoba about 60 m. s.w. of Lake Winnipeg, is about 125 m. long and about 25 m. wide, irregular in shape, with low and swampy shores. The lake is fed by the waters of several smaller lakes and by the White Mud River; the Little Saskatchewan, or Dauphin, River is the outlet into Lake Winnipeg. It was first visited by Chevalier de la Verendrye in 1739.

Manitoulin, *Man" i too' lin,* **Islands,** a group of islands separating Georgian Bay from Lake Huron. They extend in a long chain from east to west along the northern end of the lake and are separated from Canada by North Channel. The largest islands of the group are Great Manitoulin, or Sacred Isle, Cockburn and Drummond. Great Manitoulin is about 80 m. in length and has a rugged surface; its coast is indented by many large bays. Drummond Island is 24 m. long and is separated from Michigan by The Detour, the chief passageway for lake vessels entering the upper lake. With the exception of Drummond, which belongs to Michigan, the islands are a Canadian possession. The population, chiefly represented by Ojibway Indians, is about 2000.

Manitowoc, *Man" i to wok',* **Wis.,** a city and the county seat of Manitowoc Co., 77 m. n. of Milwaukee and about 112 m. n.e. of Madison, on Lake Michigan at the mouth of the Manitowoc River, and on the Chicago & North Western, the Wisconsin Central, the Ann Arbor & Pere Marquette and other railroads. Ferries connect it with Frankfort, Mich., and Ludington, Mich., and steamers ply between it and other lake ports. There is a good harbor, and considerable trade in flour, grain and dairy products is carried on. The town has large grain elevators, shipbuilding and repair yards, breweries, canning factories, hay presses, brickyards, creameries, saw and planing mills, and manufactories of machinery, agricultural implements, furniture, edge tools, glue, foundry products, cigars, leather and flour. Manitowoc contains the county insane asylum, a Polish orphan asylum, a county normal school, a Carnegie library, two hospitals and a business school. The first permanent settlement on the site of Manitowoc was made in 1836 and the place was chartered as a city in 1870. Population, 1920, U. S. census, 17,563.

Manka'to, Minn., a city and the county seat of Blue Earth Co., about 90 m. s.w. of St. Paul, on the Minnesota River, and on the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Chicago, St. Paul, Minneapolis & Omaha, the Chicago Great Western and other railroads. Among the industrial establishments are agricultural-implement works, a creamery, a candy factory, furniture factories, breweries, flour mills, foundries, machine shops, carriage factories, lime and cement works and knitting mills. A large trade in dairy and agricultural products is carried on. In the city are a Carnegie library, a fine Federal Building, a state normal school, the Tourteilotte Hospital, St. Joseph's Hospital and two commercial colleges. Minneopa State Park, containing Minneopa Falls, is four miles from the city. The place was settled about 1853 and was first incorporated in 1868. In the region surrounding Mankato occurred the uprising of the Sioux Indians in 1862, led by their chief, Mankato (blue earth). Population in 1920, 12,469.

Mann, Horace (1796-1859), one of the best known of American educators, born at Franklin, Mass. He graduated at Brown University, was admitted to the bar in 1823 and practiced at Dedham, Mass., and subsequently at Boston, until 1837. During this period he

served for six years as a representative in the State Legislature, and for four years as a state senator. In the Legislature, he was from the first identified with philanthropic interests. Withdrawing from a lucrative law practice and from politics in 1837, he rendered exceptional service for 11 years as secretary of the Massachusetts State Board of Education, went to Europe at his own expense in 1843 to study European methods, published 12 able *Annual Reports,* effectively aided in securing the establishment of the first normal schools in America, and aroused throughout the country an unprecedented interest in educational affairs. Succeeding John Quincy Adams in Congress in 1848, he served until 1853. As president of Antioch College, Ohio, from 1853 until his death, Mann exerted an influence felt throughout the West. Besides invaluable official reports, he wrote widely on educational questions.

Man'na, a sweet, flaky gum produced upon the trunk of the flowering ash, when incisions have been made in the bark. It owes its name to a chemical substance called mannite, though many gums not containing this principle are wrongly called manna. Italy is the chief source of the production of the gum, and groves of the flowering ash are there carefully tended. When the trees are about seven years old, the cuts are made, one incision a day, on one side of the tree the first year and on another side the second year, and so on, until the trees have been girdled. They are then allowed to die, and a second growth comes from the same root. Manna is employed in the preparation of medicine, but is used commonly only in the Mediterranean and South American countries.

Manna, the substance provided as food for the Children of Israel, while journeying through the wilderness on their way to Canaan. The Biblical narrative records that it fell from heaven. It consisted of small, round, white objects, having a sweetish taste. Each person gathered in the morning enough to last him through the day, but a double portion was gathered on the day before the Sabbath, which was a day of rest. Manna was provided only while the Israelites were in the wilderness.

Manning, Henry Edward (1808-1892), an English Roman Catholic cardinal, born at Totteridge, England. He graduated from Oxford in 1830, and was ordained in the Church of England two years later. In 1841 he became Archdeacon of Chichester. In 1851 he was converted to the Roman Catholic faith and was ordained a priest. In 1865 Manning was appointed Archbishop of Westminster, in which capacity he served during the remainder of his life. He was made cardinal in 1875.

Man-of-War Bird. See FRIGATE BIRD.

Manom'eter, an instrument for measuring the pressure of a gas by balancing the pressure against the weight of a column of liquid, either water or mercury. In its simplest form it consists of a U-shaped tube partly filled with mercury; one end of the tube is joined to the vessel containing the gas and the other end is left open to the atmosphere. The difference in height of the mercury in the two arms of the U is a measure of the difference in pressure of the combined gas and the pressure of the atmosphere. Such a manometer connected to the ordinary gas pipes would show that the gas pressure exceeded the atmospheric pressure by one-half to one and one-half inches of mercury; full atmospheric pressure, 14.7 lb. per square inch, is measured by a column of mercury about 30 inches high. See BAROMETER.

Mans'field, Ohio, a city and county seat of Richland Co., 54 m. s. of Sandusky and 79 m. s.e. of Cleveland, on the Erie, the Baltimore & Ohio and the Pennsylvania railroads. Interurban lines also connect with many near-by towns and cities. It is an important trade center for the adjacent country. There are manufactories of agricultural machinery, electrical supplies, paper, cigars, watch-cases, boilers, engine fittings, carriages, street cars, brass goods, pumps, webbing

and suspenders, electric-railway supplies and iron-foundry products. Mansfield is the seat of the Ohio State Reformatory, a children's home and several business colleges. It was settled in 1807, was chartered as a borough in 1828 and granted a city charter in 1857. Population in 1920, 27,824.

Mansfield, Richard (1857-1907), an American actor, born on Helgoland, an island in the North Sea. He was educated in Germany and England and came to Boston, Mass., at the age of 17, where he served as a clerk and studied art. The following year he returned to England, was engaged in comic opera, and came back to America, first appearing on the stage in New York in 1882. His wide fame as one of the greatest American actors was due to the high standards of artistic excellence which he maintained, and at all times his admirable acting was the result of patient study of details. The rôles in which he excelled were Cyrano de Bergerac, Monsieur Beaucaire, Brutus in *Julius Cæsar,* Shylock in the *Merchant of Venice,* Arthur Dimmesdale in Mansfield's own dramatization of the *Scarlet Letter,* Beau Brummell, Dr. Jekyll and Mr. Hyde and Peer Gynt.

Mantegna, *Mahn tane' yah,* **Andrea** (1431-1506), an Italian painter and engraver, the greatest master of the Paduan School. In 1459 he went to Mantua, where the remainder of his life was spent and where his chief work was accomplished, with the exception of a series of decorations at Rome, afterwards destroyed. Before leaving Padua, however, he executed a notable series of mural paintings in the Church of the Eremitani, which hold an important place in the development of painting in northern Italy. At Mantua his chief work was a realistic series of decorations in the Corte Castle. Another remarkable series, the nine cartoons called the *Triumph of Cæsar,* now at Hampton Court, London, and his *Triumph of Virtue Over Vice* and *Parnassus,* are worthy examples of the nobility, dignity and inventive and imaginative power which characterized his work. Mantegna was a highly cultivated man for his time, versed in classical literature and thoroughly familiar with antique art. He was a close student of nature and a pronounced realist.

Man'tis, Praying Mantis or **Soothsayer,** a family of peculiar Southern insects, of the order Orthoptera, whose habits have been discussed by naturalists from earliest times. The strange appearance of the creature as it stands upon its middle and posterior pairs of legs, with its forepair bent in attitude of prayer, rendered it once the object of grave inquiry and awed reverence. It was said to a diviner, a soothsayer, a prophet warning of pestilence and famine, a typical muezzin who called to prayer. One ancient writer says: "So divine a creature is this esteemed that if a childe aske the way to such a place she will stretch out one of her feet and show him the right way and seldome or never misse." A less poetical explanation of its devout attitude is that the supplicating forewings are raised to be ever ready for the hapless fly, which it seizes with unerring grasp and holds in its strongly-spined claws. Thus has the hypocritical mantis fallen into disrepute. Yet in its aid in exterminating the pestiferous typhoid fly, or house fly, it may return to its previous position of eminence. An interesting chapter on the mantis forms a part of J. H. Fabre's *Social Life in the Insect World.*

Man'ual Training, in its broadest sense that department of educational work which has for its chief purpose the training of the hand and the acquaintance with the materials used in industries. In this sense manual training includes the occupations of the kindergarten and the primary grades, such as stick laying, perforating cardboard and sewing designs traced upon cards. In its restricted sense, however, it pertains to the instruction in the theory and use of tools in the elementary processes in common trades and occupations, such as carpentry, blacksmithing, wood carving, and, in some instances, machine-

shop work and cooking and sewing; and instruction in the nature of common materials.

The first manual-training school in America was opened in 1880 in St. Louis as a department of Washington University, and was in charge of Dr. Calvin A. Woodward. Manual training was first introduced into the public schools in the Dwight School of Boston in 1882. At first the movement met with much opposition both in the elementary schools and the higher institutions. Most patrons believed that when in school pupils should devote their time to the study of books, and that time spent in manual training was wasted. It was soon found, however, that those pupils in the elementary schools who had the advantage of manual training made more rapid progress in their studies than those who were deprived of this advantage. Lack of system at first also delayed the extension of the work. But gradually each obstacle was overcome, and, before the end of the first decade of the 20th century, manual training constituted a feature of practically all city courses of study, and was likewise included in some courses for rural schools.

Manual training does not aim to teach trades in the elementary schools, but to give such systematic training to the hands through the use of tools and materials as will enable the pupil to learn any trade he may desire in much less time than it would require without this training. In the higher technical schools trades are usually taught. When properly taught, manual training has many advantages. It is of great industrial value to those who are to earn their living by the use of their hands. The cultural value is great, irrespective of the occupation which the pupil may follow, since what the pupil *does* makes the most lasting impression on him. It trains the powers of observation as nothing else can. It is a correct stimulus to systematic thinking, for when the pupil starts to construct an object he must plan his work systematically. It increases the pupil's power to do, gives him skill in the use of tools and impresses upon him the dignity of labor. See KINDERGARTEN; TRADE SCHOOLS; EVENING SCHOOLS; EDUCATION, INDUSTRIAL.

Manure', a substance placed upon the soil to increase its productive power. Commercial manures, also termed artificial and mineral manures, are generally spoken of as fertilizers (See FERTILIZER). The natural manures are of two kinds, green manures and stable manures. The former are crops, generally having long roots that contain bacteria, able to take up a great amount of nitrogen from the air and the subsoil, and thus leave the soil richer in nitrogenous products than they found it. Such are clover, alfalfa, soy beans, cow peas, rye and barley. The ordinary treatment of fields with green manures is to plow the crop under when nearly mature.

Stable manures renew the potash, phosphoric acid and some of the nitrogen taken out of the soil by plants. They furnish the best value when half rotted, but they should be preserved under cover, as otherwise they give up much of their nitrogen content. Because of their bulk they are not easily transported, but it is estimated that on the ordinary farm, fertilizer worth at least $350 is produced annually, which is available for return to the soil. That procured from the stables of horses and cows and from poultry yards is considered the most valuable. Consult: Aikman, *Manures and Manuring*.

Manure Spreader, a farm implement to spread manure or other fertilizer evenly upon a field. Those in ordinary use consist of a box wagon having small forewheels and large hind wheels, both sets of which are of steel, in order to resist the action of the acid in the manure. The hind wheels are also the driving wheels which communicate motion to the beater and the apron. The apron is a flexible, movable frame which lies in the bottom of the box and is rolled under by the motion of the wheel. The manure, which is loaded upon the

apron, is thrown off by means of a cylindrical frame set with several rows of long, steel teeth and known as the beater. The beater is located at the rear of the box and distributes the manure evenly upon the ground as fast as it is fed by the apron. The value of the spreader is apparent, since it is practically impossible to distribute the fertilizer evenly by means of a fork.

Maoris, *Mah' o riz,* the native inhabitants of New Zealand. They are a sturdy people with longer bodies and shorter legs than Europeans. They have a slightly brown skin and black eyes and hair. When first known they had brought tattooing and carving to a high degree of perfection. They were divided into tribes, each ruled by a chief who had absolute authority over his subjects. Formerly they were among the most fierce and warlike tribes of the South Pacific, but after they were conquered by the English they rapidly adapted themselves to the customs of civilization and are now an industrious and law-abiding people.

Map, a delineation on a plane surface of the whole or a part of the earth's surface. Since it is impossible to make an accurate delineation of a spherical surface on a plane, all maps are more or less inaccurate. To overcome this difficulty, a method of delineation, known as projection, is resorted to. Several systems or projections are in use, but only two are ordinarily seen. These are the polyconic and Mercator's projections. The polyconic projection is designed by rolling over the surface on which the map is to be drawn, a cone, on whose surface have been drawn several circles parallel to the base and equally distant from each other, and on which there are also straight lines extending from the apex to the base. As the cone revolves over the surface, the base and parallel circles will describe concentric circles, which represent parallels of latitude, and the straight lines will make meridians of longitude. These lines all radiate from a point, as the meridians radiate from the poles. Since the convergence of these lines approximates quite closely the convergence of the meridians on the earth's surface, maps drawn to this projection are sufficiently accurate for most purposes, and it is very largely employed in making maps in ordinary use.

Mercator's projection represents the earth as a cylinder, and the lines representing parallels and meridians cross at right angles. Mercator's projection is used for commercial maps of the world and to some extent by navigators. Whatever the projection used, the making of an accurate map requires that an accurate survey of the regions precede the construction of the map. All maps are drawn to a scale; that is, a certain space on the map, as one inch, represents a certain distance on the earth's surface, as 100 m.

Special maps are made for various purposes. Relief maps represent the contour of the surface either by the use of different colors for different altitudes, or by the use of plaster of Paris or some other materials by which mountains, plains and valleys can be represented. On all such maps the height of mountains and depth of valleys are greatly exaggerated. Maps used by navigators show in detail the outline of coasts, location of islands, sunken rocks and other obstructions to navigation, and the depth of water along the coast. Product maps show where certain products can be raised to advantage, and so on.

Ma'ple, the name of a large number of ornamental trees, grouped in the Maple Family and common in all parts of the north temperate zone. Once known, the maples as a rule are easily recognized by their straight, solid trunks, shapely tops and pointed, commonly three-lobed leaves, borne on long, wiry stems. The flowers are regular and hang in loose clusters, which are almost the same color as the bright-colored new leaves. The fruit is a pair of winged seeds, which can be borne for some distance by the wind and, when located favorably, have the peculiar habit of suddenly lifting the wing in the air

as the tiny seed germinates and sends its root into the ground. The wood of the maple is especially useful; the rock and the red maple furnish the wavy-grained woods known as bird's-eye maple and blister maple, which are valuable for furniture and for interior decoration; other varieties are used for fuel, the manufacture of woodenware, pulp for paper making, floors and common furniture. The rock, or sugar, maple and the black maple are valued for their sugary sap (See SUGAR, subhead *Maple Sugar*).

The different species of maple common in the United States are: the sugar maple, also known as rock maple and hard maple, with rugged, scaly bark; the black maple, whose bark cracks in long, hard strips and whose branches are less graceful than those of most maples; the mountain maple, with light gray or almost white, smooth bark, generally spotted with lichens; the moose, or striped, maple, known for its tough, flexible bark, which when young is striped with pale green, vertical lines; the silver-leaf maple, generally an immense tree, whose leaves are silvery white underneath; the soft maple, also called scarlet maple and red maple, which is noted for the brilliancy of its autumnal coloring; and the ash-leaved maple, also known as box elder.

The maple leaf is the emblem of Canada. See BOX ELDER.

Maracaibo, *Mah" rah ki' bo,* the chief seaport of Venezuela, is situated on a strait connecting Lake Maracaibo with the sea. It has an excellent harbor and a number of fine buildings, including a university, a Chamber of Commerce, a theater and a number of hospitals and asylums. The principal exports are coffee, timber, hides, ores and cocoa. The population is about 50,000.

Marajó, *Mah" rah zho',* or **Johannes,** a large island off the north coast of Brazil between Pará and the Amazon rivers. Its length is 180 m. and width 150 m. The surface is low, and the island is intersected by two rivers. The population is sparse.

Marat, *Ma" ra',* **Jean Paul** (1744-1793), a leader of the French Revolution, born near Neufchâtel, Switzerland. He was well educated, especially in the languages, and he studied and practiced medicine in Paris, where he also wrote several scientific and philosophical treatises. At the outbreak of the Revolution he became one of its most ardent supporters, and as a leader of the Radical Party he wielded a strong influence through his paper, *The People's Friend.* Marat was supported by the lowest classes, for his violence alienated the better element among the Revolutionists. He was ordered arrested in 1790, but avoided capture and became a member of the Commune and later of the Convention. He voted for the execution of the King and was urgent of the annihilation of the old regime. It was chiefly Marat's influence which accomplished the overthrow of the Girondists. He was assassinated by Charlotte Corday, and after his death was long known as the "martyr of the people."

Mar'athon, Battle of, one of the most important battles of history. Marathon is a plain on the coast of Attica in Greece, 20 m. north of Athens. Here, in 490 B. C., about 10,000 Athenians, aided by 1000 Platæans, met the Persian army of 20,000. Miltiades, the Athenian general, had stationed his troops on rising ground and arranged them so that his front was as long as that of the Persians. He had also strengthened the wings at the expense of the center, and though the center broke as the Athenians rushed down, the wings were victorious and closed in upon the Persians. When the invaders saw that they were in danger of being cut off from their ships, they fled in a rout toward the shore. Marathon is one of the 15 decisive battles of the world, and is so regarded because the signal defeat of the Persian army prevented the conquest of Europe by the nations of Asia.

Mar'ble, a crystalline variety of limestone capable of taking a high polish. Pure marble is white, but various im-

purities produce different colors and different shades of the same color, so that there are many varieties, ranging from pure white to almost jet black. Carbonaceous matter produces a gray or a bluish tint. Compounds of iron give pink, red, yellow or brown hues. The "clouded" effect is produced by the irregular distribution of the impurities, and the beautiful "veining" effects are caused by the presence of foreign matter which entered fissures when the marble was broken by movements of surrounding rock.

The purest white marble is used for stairways and is the most expensive. The finest grade is obtained from Carrara, Italy, and is known as Carrara marble. Other marble quarries are also found in lands on the Mediterranean Sea. Other varieties of marble are extensively used for monuments, headstones and in buildings, especially for finishing interiors. The United States is the leading country of the world in the production of marble, and there are extensive quarries in the southwestern part of Vermont, in Georgia, in Tennessee and in several other states. In these quarries and the mills connected with them, practically all the work is done by machinery. The rock is cut from its bed by channeling machines, and there is but little waste.

Marblehead, Mass., a city and summer resort of Essex Co., 18 m. n.e. of Boston, on Massachusetts Bay and on the Boston & Maine Railroad. It is situated on a small peninsula, very rocky and uneven, and has Massachusetts Bay on the south and east and Salem Harbor on the north. Clifton, Marblehead Neck and Devereux are near-by villages. Marblehead has a commodious harbor and is one of the oldest and quaintest towns of New England. It is a favorite yachting and summer resort. The chief industries include boat building, fishing and seed growing and the manufacture of boots and shoots. Marblehead was for a time the second settlement in importance in the colony, Boston being the first. The town was settled by immigrants from Guernsey and Jersey in 1629 and until 1649 was a part of Salem. Population in 1920, 7,324. Summer population 12,000.

Marbles, small spheres, made at one period almost exclusively from chips of marble, but now made also from various other substances. In Saxony, where a hard limestone is found, small cubes are cut out and thrown, 100 or 150 at a time, on a stone slab which has numerous concentric circles cut in its surface; then a block of oak is lowered upon the little cubes and revolved by machinery while water flows in upon the slab. In about 15 minutes the cubes are thus worn into spheres, and three such mills are said to manufacture 60,000 marbles per week. The common agates are made in large quantities at Oberstein. The bull's eye and striped marbles are molded, then baked, painted and glazed. In very early periods, children used round nuts and smooth stones for various games; and today in every part of the world marbles are used in one way or another by a large proportion of the children. No specific rules for the game have, however, been formulated, and practically every locality plays according to its own rules.

Marcellus, *Mar sel' us,* **Marcus Claudius,** a Roman general who flourished in the third century B. C. He won several victories over Hannibal during the Second Punic War. In 214 B. C. he took charge of the war in Sicily, two years later becoming master of Syracuse. In 208 B. C. he was elected consul for the fifth time and again took charge of the army against Hannibal, but was slain.

March, the third month of the year, containing 31 days. This was formerly the first month of the Roman year, and until 1752 the first month also of England's year. Its name comes from the Roman god of war, Mars. The vernal equinox occurs about the 21st of this month. See YEAR; MONTH; EQUINOX.

March, Francis Andrew (1825-1911), an American author and philologist, born at Millbury, Mass., and educated at Am-

herst. He studied law in New York and was there admitted to the bar; because of ill health he spent the succeeding years in teaching. He became president of the American Philological Association in 1873 and later of the Modern Language Association. March was the editor of numerous Greek and Latin texts, was the consulting editor of the Standard Dictionary and was the head of the American staff of an English dictionary. He was the author of *A Method of Philosophical Study of the English Language, Comparative Grammar of the Anglo-Saxon Language* and an *Anglo-Saxon Reader.*

Marconi, *Mar ko' ne,* **Guglielmo** (1875-), an Italian electrician, born near Bologna, Italy, and educated at the university of that city. He early gave promise of remarkable ability and was soon associated with Professor Righi in the study of physical phenomena. The world owes to Marconi the wireless telegraph, now in wide use on land and sea. Because of the apathy of the Italian Government, Marconi took his plans to England, where they were immediately accepted, and the Marconi Wireless Telegraph Company was founded. He has made many improvements in his system, which he first exhibited in the United States in 1901. See TELEGRAPH, WIRELESS.

Mar'cus Aure'lius. See AURELIUS, MARCUS.

Mardi Gras. See SHROVE TUESDAY.

Maren'go, Battle of, a great battle between the French under Bonaparte and the Austrians commanded by Melas, fought June 14, 1800, at Marengo in Italy. At first the Austrians were successful, but the French general, Desaix, reinforced Napoleon, and the Austrians were surprised and defeated. As a result of this battle, Genoa, Piedmont and Milan were lost by the Austrians and the power of Napoleon was established.

Mar'garet (1353-1412), sometimes called the "Northern Semiramis," Queen of Denmark, Norway and Sweden. She was the second daughter of Waldemar IV, King of Denmark, and the wife of Haakon VI of Norway. The death of Haakon, in 1380, left her sole guardian of her son, Olaf, whose death in 1387 made her ruler of Norway and Denmark. Meanwhile, King Albert of Sweden had so alienated his subjects that they offered her their crown. Having defeated Albert in battle, she entered Stockholm in 1397, producing her remarkable Union of Kalmar, for the permanent union of the three kingdoms.

Margaret of Anjou, *Ahn" zhoo',* (1430-1482), daughter of René, titular King of Naples, and wife of Henry VI of England, whom she married in 1445. Because of Henry's ill health, she was virtual sovereign, but a secret contract at her marriage, relinquishing Maine and Anjou to France, caused dissatisfaction, and she was blamed for the English loss of all French possessions save Calais. When the Duke of York contested her power, the Wars of the Roses commenced (See ROSES, WARS OF THE), and after 20 years of struggle she was defeated and imprisoned, till redeemed by Louis XI of France.

Maria Theresa, *Ma ri' a Te re' sa,* (1717-1780), Queen of Hungary and Empress of Germany. She was the daughter of Emperor Charles VI. After her father's death, she was attacked by France and Bavaria in Bohemia, and Frederick the Great seized Silesia. By the treaty of Aix-la-Chapelle in October, 1748, she made peace with Prussia by giving up Silesia, and by giving other provinces to Spain she secured her husband's election as emperor. She allied herself with France and Russia to avenge herself upon Frederick (See SEVEN YEARS' WAR). Maria Theresa's husband, Francis I, died in 1765, and from this time her eldest son Joseph was associated with her in the government. Among the chief reforms of Maria Theresa's reign were those in the army, in the courts of law and in education.

Marie Antoinette, *Ma" re' Ahn" twa" net',* (1775-1793), Queen of France and daughter of Francis I and Maria Theresa. At 15 she was married to the Dau-

phin, who was later crowned as Louis XVI. Her dislike of court etiquette and her frivolity and extravagance led her into many indiscretions and she steadily influenced the King against reform and lavished honors upon her favorites. She went with her husband in his imprisonment in the Temple, and acted with patient dignity in the trying days that followed. She was charged with extravagance, with having held communication with the enemies outside of France, and with having encouraged those within to arm themselves against the republic. She was found guilty of these charges and was executed October 16, 1793.

Marie Louise, *Ma re' Loo ez'*, (1791-1847), second wife of Napoleon I and daughter of Francis I of Austria. She married Napoleon following his divorce from Josephine, and the next year, in March, 1811, bore him a son. At the opening of the campaign of 1813 Napoleon appointed her regent, and on his abdication she went to Austria. At the Congress of Vienna she was awarded the duchies of Parma, Piacenza and Guastalla, which she ruled until her death.

Ma"riet'ta, Ohio, a city and county seat of Washington Co., 80 m. s.e. of Zanesville and 132 m. s.e. of Columbus, the capital of the state, on the north bank of the Ohio River, at the mouth of the Muskingum River, and on the Baltimore & Ohio Southwestern, a branch of the Pennsylvania, and the Marietta, Columbus & Ohio railroads. The Ohio River is here spanned by a bridge which connects Marietta with Williamstown, W. Va. There is an extensive production of and trade in petroleum, which is obtained in the vicinity. There are also distilling, brewing and boat-building industries. The manufacturing establishments include glassworks, furniture factories, oil-well tool shops, brick plants, flour mills, bicycle-rim and boiler shops, carriage and wagon works, casket shops and factories for making lumber products and leather. The city has large commercial interests through its river trade.

The Marietta College, coeducational, founded in 1835, is located here. There is a public library containing a large number of volumes, which is noted for its works on the history of the Northwest. Marietta is the oldest town in the state, having been founded in 1788 by Gen. Rufus Putnam and people from New England under the authority of the Ohio Company, who had secured a grant of lands on both sides of the Muskingum River. The place was named in honor of Marie Antoinette. The Northwest Territory was organized here in July, 1788. Marietta was incorporated as a town in 1800. In 1890 the village of Harmar was annexed to the city. Here are found some earthworks of the ancient mound builders. Population in 1920, U. S. census, 15,100.

Marigold, *Mair' i gold*, a garden flower of the Composite Family, native in Europe. The leaves are stemless and oblong; the velvety, double flowers are yellow or brownish and have a heavy odor. The marsh marigold, often wrongly called cowslip, is a member of the Crowfoot, or Buttercup, Family. It is an early spring wild flower with a cluster of rounding, dark green, juicy leaves and beautiful golden flowers. It is common along low streams and in marshy places. The stems and leaves are used as greens.

Marines, *Ma reens'*, men trained as infantry or artillery soldiers for service in the navy. The marines, or marine corps, constitute the exclusively fighting portion of the personnel of a man-of-war, doing police duty and serving in landing expeditions. They also do duty on land at seaports. They are members of the navy trained to serve also on land, as the naval militia are members of the army trained to serve in time of need at sea. See NAVY; ARMY; NAVAL RESERVE.

Marinette, *Mar" i net'*, **Wis.,** a city and the county seat of Marinette Co., about 50 m. n.e. of the city of Green Bay and 178 m. n. of Milwaukee, on Green Bay, an arm of Lake Michigan, at the mouth of the Menominee River. Railroads entering the city are the Chicago, Milwaukee & St. Paul, the Chi-

cago & North Western, the Wisconsin & Michigan and others; and steam and electric trains and bridges connect the town with Menominee, on the opposite side of the river. Marinette has a fine harbor and a large and growing lake commerce, chiefly in iron and lumber. There is good water power at this point and manufacturing is an important industry. Chief among the manufactories are steam thrashing-machine works, paper and pulp mills, pail and broom factories, cabinet shops, gas- and traction-engine works, furniture factories and ironworks, and factories for boats, boilers, woodenware, agricultural machinery, furniture and boxes.

Among the important buildings and institutions are a Federal Building, two hospitals, fine school buildings, Our Lady of Lourdes' Institute, the Stephenson Public Library, founded by Senator Isaac Stephenson, and a county agricultural school and training school for rural teachers. At Chautauqua Park, a few miles from Marinette, on Green Bay, the Northern Chautauqua Assembly holds its annual sessions. Marinette was settled on the site of a Menominee Indian village in 1830 and was named for the daughter of an Indian chief. The place was chartered as a city in 1887. Population in 1920, U. S. Census, 13,610.

Mar'ion, Francis (1732-1795), an American soldier, born near Georgetown, S. C., of Huguenot descent. He served (1761) in the Cherokee War as a lieutenant under Moultrie, entered the service as captain when the Revolution began, and soon became brigadier-general. He accompanied Moultrie on his occupation of Ft. Sullivan, June, 1776. Later he was placed in command of that post, took part in the unsuccessful attack on Savannah and fled to North Carolina. Returning to South Carolina, Marion organized a small force, varying from 20 to 70 men, with which he harassed the British, and distinguished himself at Nelson's Ferry and at Eutaw Springs. In 1782 he was elected to the State Senate and later served in the Constitutional Convention. Marion was the greatest partisan leader of the Carolinas, and the British called him the "Swamp Fox."

Marion, Ind., a city and county seat of Grant Co., 40 m. s.e. of Logansport and 68 m. n.e. of Indianapolis, on the Mississinewa River and on the Cleveland, Cincinnati, Chicago & St. Louis, the Chicago, Cincinnati & Louisville and other railroads. Interurban electric lines connect the city with Indianapolis and other towns and cities. It has abundant water power and a good supply of natural gas. Marion contains flour, saw and planing mills, pulp and paper mills, linseed-oil works, foundries, brickworks, machine shops, rolling mills, window-glass, fruit-jar and bottle factories, furniture and bedstead works and cornice works. A National soldiers' home is located three miles south of the city. Marion is the seat of a large normal college. There is a fine public library. Population in 1920, 23,747.

Marion, Ohio, a city and county seat of Marion Co., 35 m. s.w. of Mansfield and 45 m. n. of Columbus, the capital of the state, on the Erie, the Hocking Valley and the Cleveland, Cincinnati, Chicago & St. Louis railroads. It is situated in an agricultural district and has notable lime and stone industries. There are also malleable ironworks, silk mills, lime kilns, a piano factory, steam-shovel works, agricultural-machine shops, steam-engine and boiler works, wood-pulley works and a mattress factory. A home for aged women and Sawyer Sanitarium are located here. Marion was settled by people from Rhode Island in 1815. It was incorporated in 1820 and received a city charter in 1890. Population in 1920, 27,891.

Marion Harland. See TERHUNE, MARY VIRGINIA.

Mariotte's, *Mah" re ots',* **Law.** See GASES, LAWS OF.

Mar"ipo'sa Lily. See TULIP.

Ma'rius, Caius (about 156-86 B. C.), a Roman general of lowly birth, born near Arpinum. He came into prominence as a soldier of the younger Scipio in 134 B. C., and 15 years later he

became a tribune, in which position he won the hatred of the nobles by his vigorous defense of the cause of the people. Not long after came the threatened invasion of Italy, which was stayed by Marius, who annihilated the German army at Aquæ Sextiæ (Aix) in southern Gaul, and the next year had the same success against the Cimbri. Contrary to the law that no one should fill the office of consul for two successive years, Marius was elected to the position six times in succession, for it was felt that he alone could cope with the difficulties that faced the republic. He became jealous of the growing power of Sulla, who had been appointed general against Mithridates by the Senate, while Marius was chosen by the people for the same task. Sulla led an army against Rome, became master of the city and drove Marius into exile; then he left for his campaign in the East. After the departure of Sulla, Marius returned to Italy, captured Rome and, with Cinna, proclaimed himself consul without the pretense of an election. He died 17 days later. Marius was uneducated, coarse and rough in manner, and his influence in time of peace was not so great as his skill in warfare.

Mar'joram, an old-fashioned herb of the Mint Family, grown as a seasoning plant or as an aromatic for linen chests. It is a square-stemmed plant, with hairy, oval leaves often marked by oily dots. The purplish-white or pink flowers are crowded together upon leafy spikes, and each blossom has the characteristic two-lipped corolla, common to this family. The time of bloom is July or August. Marjoram was introduced from Europe, where it is much valued as a seasoning herb.

Mark An'tony (83-30 B. C.), a Roman general and friend of Cæsar. His Latin name was Marcus Antonius. He served with Cæsar in the Gallic Wars, took sides with him in his war with Pompey, and was consul with him in 44 B. C. After Cæsar was assassinated, Antony aroused the people against the conspirators, and, joining forces with Octavius and Lepidus, defeated Brutus and Cassius at Philippi (See AUGUSTUS). The Roman world soon fell to Antony and Octavius, as they shortly disposed of Lepidus. Antony had the East and Octavius the West. Each gave up his friends at the request of the other, and it was at this time that Cicero fell a victim to the hatred of Antony. Antony fell in love with Cleopatra, Queen of Egypt, and neglected his wife and his government. In 32 B. C. Octavius declared war against Cleopatra and deprived Antony of his consulship and of his share of the Roman world. Antony was defeated by Octavius at the Battle of Actium, 31 B. C., and retreated to Egypt, where he suffered a second defeat. He committed suicide by falling on his sword when he was falsely told of Cleopatra's death. See CÆSAR, CAIUS JULIUS; CLEOPATRA.

Markham, *Mar' kam,* **Edwin** (1852-), an American poet and lecturer, born in Oregon City, Ore. After completing his education he was principal and superintendent of schools in California, and won fame upon the publication of his poem, *The Man with the Hoe.* Millet's painting of the same name suggested the theme. Among other writings are *Lincoln, and other Poems, The Social Conscience* and *The Hoe-Man in the Making.*

Mark, Saint, the author of the *Gospel of St. Mark* (See GOSPELS, THE). He is probably the person spoken of in the *Acts of the Apostles* as "John, whose surname was Mark." His mother, Mary, was a follower of Christ, and her house at Jerusalem became the refuge of the early Christians there. Mark was the cousin of Barnabas, and he accompanied Paul and Barnabas on their first mission. He is the reputed founder of the Alexandrian Church.

Mark Twain. See CLEMENS, SAMUEL LANGHORNE.

Marl, a term applied to a variety of rocks and soils of widely varying composition, but usually employed to designate a mixture of calcium carbonate and clay. Marls become friable upon expo-

sure to air and readily crumble to dust. If then mixed with water, the material becomes pasty and the presence of carbonate of lime will cause it to effervesce. The typical marls are calcareous marl, that in which lime predominates; and clay marl, or argillaceous marl, that which contains a large proportion of clay. Marls are called indurated when hard; earthy when soft. They are found in masses or beds in association with sand, gypsum, clay or limestone, and usually contain fossil remains. The marls of the United States are roughly divided into three classes: (1) blue marl, or shale marl, which contains a large percentage of carbonate of lime, and is, therefore, of great agricultural value; (2) chalky marl, coarse in texture and containing from 50 to 95 per cent of lime; and (3) cretaceous marl, found chiefly in New Jersey, and commonly known as green sand marl. It is composed chiefly of clay and green sand, with only one or two per cent of carbonate of lime. The chief value of marls is as fertilizers, either of worn-out soils or for enriching those naturally poor. Owing to the fact that their efficacy depends largely upon quantity, this kind of soil treatment is economically impracticable, except for soils located in close proximity to the marl deposits.

Marlborough, *Marl' bo ru,* **John Churchill,** DUKE OF (1650-1722), an English general and statesman. He became a soldier in his youth and made rapid advancement, strengthening his position at court by his marriage with Sarah Jennings, an attendant of Princess Anne. On the accession of William III Churchill went over to the King's side, but he was soon charged with treasonable communication with James II, and was confined in the Tower. Not long afterwards, however, he obtained his release. When the War of the Spanish Succession broke out William made Churchill commander of the English forces in Holland. The following year (1702), on the accession of Queen Anne, he was created captain-general of the forces at home and abroad, and in the campaign of this year drove the French out of the Spanish Guelders and took several towns. He was then created Duke of Marlborough. With Prince Eugène of Savoy, he won the famous victories of Blenheim, Oudenarde and Malplaquet. Marlborough ranks next to Wellington among England's greatest generals.

Marlborough, Mass., a city of Middlesex Co., 15 m. e. of Worcester, on the Boston & Maine and the New York, New Haven & Hartford railroads. St. Ann's Convent and Academy are located here. The principal manufactures include automobiles and tires, boots and shoes, wagons, carriages, electrical machines and appliances, hose pipe, woodenware, cigars, lamps and machine-shop products. Marlborough was settled in 1656 by a colony from Sudbury, Mass., and four years later was incorporated as a town. In 1676, during King Philip's War, the town was nearly destroyed by the Indians. A city charter was granted in 1890. Population in 1920, U. S. census, 15,017.

Marlowe, *Mar' lo,* **Christopher** (1564-1593), an English dramatist, born in Canterbury. He studied at King's School, Canterbury, and graduated at Cambridge in 1583. By 1587 he was in London, writing for the stage. His early death cut short a brilliant literary career, and he showed promise of equaling Shakespeare. Although he devoted only six years to the drama and produced only four plays, he is recognized as the father of English tragedy and the originator of English dramatic blank verse. The melody of his lyrics is admirable; the splendor, sublimity and tragic intensity of his most elaborate scenes have no parallel in the whole range of tragedy. His two poems, *Passionate Shepherd* and *Hero and Leander,* are almost faultless in melody and technique. The four great plays are *Tamburlaine the Great, Dr. Faustus, The Rich Jew of Malta* and *Edward the Second.*

Marlowe, Julia (1870-), an American actress, born near Keswick, England. At the age of five she re-

moved with her parents to the United States, and lived for some time in Cincinnati, Ohio. She began to take part in juvenile performances when she was 12 years old. In 1887 she appeared in New York, and her rôle as Parthenia in *Ingomar,* which was presented in Boston the following year, was a decided success. She was married to Robert Taber in 1894, but they were divorced five years later. Together with E. H. Sothern (to whom she was married in 1911) she has played in several Shakespearean dramas.

Mar'mora, Sea of, a small body of water connecting with the Black Sea by the Bosporus and with the Ægean Sea by the Strait of Dardanelles. It is 140 m. long, 45 m. wide and from 600 to 4000 ft. deep. Among its islands is the Marmora, famous for its marble and alabaster quarries.

Marmoset, *Mar' mo zet",* a family of small South American monkeys, characterized by having 32 teeth. The members of this family live high in the tree tops of the forest and are unusually shy. Their furry coats are gray, brown or black; their faces are naked, but often bear cottony patches of hair upon cheeks, chin or ears. Frequently, too, the hair of the neck is lengthened into a mane. The natives trap them and make pets of them, or send them to Northern menageries and zoos, where they make clever and interesting captives.

Mar'mot, a name applied chiefly in the Old World to a group of Rodents of the Squirrel Family. They have coarse, gray fur, stout little bodies and slender but strong limbs. They live in galleried burrrows upon hill or mountain sides, and come forth by day to eat of the tender shoots and vegetables.

The marmot in the United States is called the woodchuck or the ground hog. See WOODCHUCK.

Marne, Battles of. The Marne is a small river of Northeastern France that flowing from the east in a long curve, comes to the north, empties into the Seine near Paris. Various battles fought along and near this river have been among the most important in history. One, the Battle of Chalons, in 451, is ranked among the Fifteen Decisive Battles of History. There, Attila the Hun was defeated, and the civilization of Western Europe saved. But the First Battle of the Marne in September, 1914, far outclassed that ancient battle in the numbers engaged, and the wonderful victory there won over the armies of Germany was not of less importance in its influence on the world. Four years later, in the great offensive movement of German, occurred a series of vitally important battles in the same section sometimes called the Second Battle of the Marne. In these battles Americans are especially interested since American forces contributed much to the final result. The battle of Chateau Thierry, June 2, 1918, repulsed the German drive on Paris and was the harbinger of final victory. A few days later came the battle of Belleau Woods, another American victory. Thus the Marne becomes one of the great rivers in history where the forces of the East and the West met in conflict destined to influence civilization itself.

Marquette, *Mar ket',* **Jacques** (1637-1675), a French Jesuit missionary and explorer in America, born in Laon, France. His family belonged to the aristocracy, and until 17 years of age Jacques was reared in luxury. At this time he entered a Jesuit college and prepared for the priesthood. He soon gained reputation as a linguist and a preacher and was noted for his deep piety. In 1666 he came to America. Soon after his arrival at Quebec he was sent to Three Rivers to learn the Algonquin language, which he acquired with remarkable facility. In 1668 he went to Lake Superior, where he founded a temporary mission at Sault Ste. Marie. The next year he was sent to La Pointe de St. Esprit, near the western end of Lake Superior. Here he remained until 1671, when the hostility of the Sioux compelled Marquette and his Huron followers to abandon the mission and move eastward. He went

to Mackinaw, where he founded the mission of St. Ignatius on the site of the present town of St. Ignace. While at St. Esprit, Marquette learned much of the Mississippi River, which he longed to explore for the purpose of carrying the Gospel to the Indians residing on its banks.

In December, 1673, Louis Joliet arrived at St. Ignace with a commission to take Marquette as a companion and explore the Mississippi. The winter was spent in preparation for the voyage, and on May 17, 1673, the expedition set out in two canoes. The route was via Green Bay, the Fox River to its portage, thence down the Wisconsin to the Mississippi, which stream they descended to its confluence with the Arkansas. The return was made by way of the Illinois River and Lake Michigan. Green Bay was reached the last of September. The expedition traveled over 2500 m. through an unknown country without losing a man or a canoe.

On their passage up the Illinois River the explorers found, near the present village of Utica, Ill., a large village of the Illini, or Illinois, Indians, upon whom Marquette made a strong impression, and they exacted from him a promise that he would return and establish a mission among them. But the long journey upon which he had engaged was too strenuous for his frail system, and he returned to Green Bay broken in health. Here he remained until October, 1674, when he began the journey to the Illinois. His party reached the Chicago River in December, but Marquette's strength would permit of his going no farther, and a log cabin was built in which he and two companions spent the winter. This was the first building erected by white men on the site of Chicago, and its location is now marked by a large cross. In the spring of 1675 Marquette resumed his journey and reached the Illinois village early in April. Here he established a strong mission, but failing health compelled him to give up the work. He attempted to return to St. Ignace, but he died on the banks of a little stream near the present site of Ludington, Mich. The next spring the Indians carried his bones to St. Ignace, where they were buried.

Marquette's saintly life and unselfish devotion to the welfare of the Indians gave him a remarkable influence over them, and he is the ideal French Jesuit missionary of New France. The State of Wisconsin has placed his statue in the rotunda of the Capitol at Washington, and a heroic statue in bronze adorns the Government Park at Mackinac Island. Consult Parkman, *La Salle and the Discovery of the Great West;* Thwaites, *Father Marquette.*

Marquette, Mich., a city and the county seat of Marquette Co., 58 m. n.w. of Escanaba and 155 m. w. of Sault Ste. Marie, on Iron Bay, an inlet of Lake Superior, and on the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Marquette & Southwestern, the Duluth, South Shore & Atlantic and other railroads. The city is beautifully situated on a bluff 100 ft. above the lake and is in a rich iron-ore region. It has a fine harbor and well-equipped ore docks, and is an important port of entry. It is one of the chief industrial and commercial centers of the Lake Superior district. In the town are foundries, machine shops, sash, door and blind factories, carriage works, a wood-alcohol plant, several lumber and planing mills, bottling works, flour mills and an acetic-acid plant. In the vicinity are valuable quarries of red-brown sandstone.

Notable features of Marquette are the United States Government Building, courthouse, city hall, new manual-training and high school, the Michigan State Normal School, the Peter White Public Library, the opera house, the Protestant Episcopal and Roman Catholic cathedrals, the Upper Peninsula State Prison and House of Correction and St. Mary's Hospital. Presque Isle Park, a beautiful headland north of Marquette, was presented to the city by the Federal Government. The first settlement on the site of Marquette was made about 1845

and named Worcester; the place was incorporated as a village in 1859 and chartered as a city in 1871. The name was changed to Marquette in honor of the French missionary explorer of that name. Population in 1920, 12,718.

Marriage, *Mar' ij,* the union of a man and a woman under the relationship of husband and wife that is sanctioned by the community. Three systems of marriage exist: monogamy, in which the man can have only one wife; polygamy, in which the man can have more than one wife at the same time; and polyandry, in which the woman can have more than one husband at the same time. Polyandry exists in Tibet and some other localities in Asia, and polygamy is found in Mohammedan countries and among the native tribes of Africa, but monogamy is the only system of marriage legalized in most civilized countries.

The Cathòlic Church and many Protestant denòminations regard marriage as a sacrament, but in most countries it is also regarded as a civil contract, although of such a nature that the contract cannot be set aside by mutual consent of the parties. In England and most other European countries, the marriage ceremony can be performed by clergymen and by those civil officers designated by law. The English custom prevails throughout the United States, though the laws in the respective states often differ in minute particulars. In most states a judge of a court of record, a justice of peace, the mayor of a city and the clerk of a county are the civil officers authorized to perform the marriage ceremony, and in all states the authority is conferred upon ordained clergymen. Nearly all states require a license which must be procured of the authority authorized to issue marriage licenses; in others, a license is not necessary. In most states two witnesses are necessary.

Infants, that is, those under legal age, cannot marry without consent of their parents or guardians. In most states this age is fixed at 18 years for women and 21 years for men. However, a marriage by parties under age without the consent of the parents is not considered void, but it is voidable. Marriages between whites and persons of negro descent are prohibited in Alabama, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Idaho, Indiana, Kentucky, Louisiana, Maryland, Mississippi, Missouri, Nebraska, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Utah, Virginia and West Virginia. Marriages between whites and Indians are void in Arizona, North Carolina, Oregon and South Carolina; and between whites and Chinese in Arizona, California, Mississippi, Oregon and Utah. Marriage between first cousins has been forbidden in several states.

Common-law marriage, that is, the living together of a man and woman as husband and wife by mutual consent without marrying according to legal forms, is generally recognized as binding in the United States, though it is no longer so recognized in England.

The rights of married women to hold property, make contracts and transact business in their own name vary in the different states. In many states the wife can hold property, make contracts and transact business pertaining to that property the same as though she were single. In practically all states the wife secures at marriage a dower interest of one-third of her husband's estate, and real estate cannot be sold without her signature to the deed. The husband is responsible for the support of the wife and family, and desertion in most states is considered a criminal offense. See DIVORCE.

Marryat, *Mar' i at,* **Frederick** (1792-1848), an English sailor and novelist, born in Westminster. He ran away to sea, enjoyed lively adventures as a midshipman and won distinction for gallant service in rescuing. His novels opened up a fresh field for fiction, with their vivid scenes from the open sea, their humor and stirring escapades. Among them are *Mr. Midshipman Easy, The Phantom Ship, Masterman Ready* and *The Children of the New Forest.*

Mars, the planet of the solar system fourth outward from the sun. Its mean distance from the sun is 141,000,000 m.; its diameter is 4230 m.; its day is 24 h., 37 m., 22.7 s.; its year is 687 days, or nearly twice that of the earth; its rate of movement in its orbit is 899 m. per minute, or 14.99 m. per second. It has two satellites or moons, Phobos and Deimos, discovered in 1877. Deimos revolves around Mars once in a little more than a Mars day, but Phobos speeds three times around every Mars day.

At its nearest point to the earth, Mars is 35,500,000 m. distant, and, owing to the powerful telescopes used in modern observatories, its surface has became well known. When seen through the telescope, the surface presents light and dark areas. By common consent of astronomers, the light portions are considered land, and the dark, water. The so-called "canals" are dark lines connecting dark areas. The theory that these dark areas and canals are water has never been verified. Around each pole are large, white areas, which, with good reason, are believed to be ice and snow, since they decrease during summer and increase during winter at each pole. The weight of opinion is that Mars has an atmosphere containing watery vapor, but some astonomers claim that there is no atmosphere, because its presence is not revealed in the spectrum of the planet.

In many respects Mars is similar to the earth. Owing to the length of its year, the seasons are about twice as long as on the earth, and, owing to its distance from the sun, the temperature is probably somewhat lower. Its small size would make objects upon its surface weigh about one-half what they do on the earth. A person weighing 150 lb. here would weigh 75 lb. on Mars. During 1909 Mars was near the earth, and conditions were very favorable for observation. Some of the former theories were strengthened by these observations, but some of the conjectures, such as that the canals were the work of the inhabitants, failed of verification. Many reports of objects seen on Mars are without foundation, since at its nearest point Mars is 148 times farther from the earth than the moon, and objects on Mars, in order to be seen as distinctly as on the moon, would have to be 148 times as large. See PLANET; SOLAR SYSTEM.

Mars (in Greek, Ares), son of Jupiter and Juno, Roman god of war. His body was said to cover acres and his voice to have the volume of 10,000 men. Terror, Fear and Strife were his comrades for battle. Venus was his only love. Romulus, founder of Rome, was one of his children. Human sacrifices were sometimes offered in the temples of Mars, who was usually represented with complete armor and round shield.

Marseillaise, *Mar" se laze',* **The,** the French national hymn. The words and music of this inspiring song were composed in 1792 in a single night by Rouget de Lisle, a young patriotic French officer at Strassburg. The hymn received its name because it was first sung publicly by volunteers from Marseilles in July, 1792. It was suppressed by Napoleon and the Bourbons, but was heard again in 1830. It was again placed under the ban by Napoleon III, but after his fall it became the national anthem of the French.

Marseilles, *Mar salz',* a city of France, chief seaport of the Mediterranean, situated on the Gulf of Lyons, 219 m. s.e. of Lyons. Beyond the city to the east extends an amphitheater of hills, of which the more distant peaks are barren and rugged. Although the city was occupied by the Greeks and Romans at one time, few medieval buildings exist. Prominent features of interest include the Cathedral, the French Court House, the ancient Church of St. Victor, the exchange, the Hôtel-de-Ville, the triumphal arch of Aix and the Palais Longchamp. There are several educational institutions of note. The opening of the Suez Canal and the conquest of Algeria added to the prosperity of the city. Soap making and the manufacture of candles are leading industries. Others include the smelting of iron and copper,

building iron ships, flour milling, distilling, tanning, sugar refining and the manufacture of foods and tin goods. Greek mariners settled in Marseilles, then known as Massalia, about 600 B. C. The city was several times in the hands of invaders, but came under the dominion of the counts of Provence in the tenth century. Population 575,000.

Marsh, a tract of low land on which the water stands about even with the surface. A swamp marsh is caused in a number of ways. The surface may be so nearly level that water will not flow from it until the soil has become saturated. Marshes formed in this way are common on prairies, on the flood plains of rivers and on deltas. Again, the accumulation of vegetation may cause marshes. Decaying rushes and moss and fallen leaves and branches obstruct drainage until the soil becomes saturated. Marshes are also caused by the growth of a moss from which peat is formed. Such marshes are usually called peat bogs. Salt marshes are found along the seacoast where the land is low. The most extensive marshes are found in the low plains of Siberia and Canada, where fresh water, salt water and ice combine in their formation. These marshes are known as tundra.

Marsh, George Perkins (1801-1882), an American diplomat and philologist, born in Woodstock, Vt., and educated at Dartmouth College. He sat in Congress from 1843 to 1849, then served as minister to Turkey till 1853, and from 1861 till his death was the first United States minister to Italy. His writings include *The Origin and History of the English Language* and *The Earth as Modified by Human Action.*

Marsh, Othniel Charles (1831-1899), an American paleontologist, born in Lockport, N. Y. In 1860 he graduated from Yale, where from 1866 until his death he was professor of paleontology. Meanwhile he had charge of several scientific expeditions to the Rockies and was associated with the United States Geological Survey. He discovered over 1000 new fossil Vertebrates, wrote widely and received many honors. In 1898 he presented to Yale his collections of a lifetime and his estate valued at $150,000.

Mar'shall, John (1755-1835), an eminent jurist, chief justice of the United States Supreme Court, born at Germantown, Va. His early education was conducted by private tutors, and at the age of 18 he began the study of law. This was soon interrupted, however, by the outbreak of the Revolutionary War, and he enlisted as lieutenant in his father's regiment, serving for six years. He resumed the study of law in 1780, and began to practice at the close of the war, quickly rising to high distinction at the bar. He served several terms in the Virginia Legislature, and was a strong advocate of the Federal Constitution in the Virginia convention, he and James Madison being largely responsible for its ratification.

Marshall declined several political appointments, but in 1797 served with Gerry and Pinckney as commissioners to France. He was elected to Congress in 1798, and was secretary of state under John Adams in 1800-1801. Adams then appointed him chief justice of the United States Supreme Court, a position which he held until his death. His decisions were of great value in establishing interpretations of the Federal Constitution. Chief Justice Marshall was a tall, angular, homespun man, but not without dignity. He was just and simple, absolutely honest, fearless in his decisions, a lawyer of prodigious learning and a judge of sound judgment—one of the world's great jurists.

Marshall, Thomas Riley (1854-), an American statesman, born in Manchester, Ind., and educated at Wabash College. After studying law in Columbia City, he was admitted to the bar and began practice in 1875. During his career as a lawyer he became interested in politics, but did not hold public office until 1909, when he became governor of Indiana, as a Democrat. While governor he made a reputation as the advocate of progressive legislation. In 1912

he received the nomination for the vice-presidency at the Democratic National Convention held at Baltimore, and in the fall election, with Woodrow Wilson, won the victory by an unprecedented majority of electoral votes. He was nominated with Mr. Wilson in 1916 and again elected vice-president. Mr. Marshall is a descendant of Chief Justice Marshall and of Charles Carroll.

Marshall, Tex., a city and the county seat of Harrison Co., 42 m. w. of Shreveport, La., on the Texas & Pacific, the Marshall & East Texas and other railroads. It is in a fertile farming district, of which fruits, corn, cotton and vegetables are the principal products. There is a modern street-railway system. The industrial establishments include machine shops, a foundry, an ice factory, saw and planing mills, a cannery, cottonseed-oil mills, railroad shops, carriage works and car-wheel works. Marshall also contains the largest crate and basket works in the South. The city is the seat of Wiley University (Methodist Episcopal) and Bishop College (Baptist) for negroes. Other prominent features are an opera house, city hall, a Carnegie library, Kahn Memorial Hospital and a fine courthouse. Natural gas is used for all purposes. Population in 1920, 14,271.

Marshalltown, Iowa, a city and the county seat of Marshall Co., about 60 m. n.e. of Des Moines, on the Chicago & North Western, the Iowa Central, the Chicago Great Western and other railroads. The city is surrounded by a stock-raising and rich farming section, of which the chief products are wheat, corn, horses, swine and neat cattle. It contains grain elevators, meat-packing plants, glucose factories, flour mills, carriage works, furniture factories, bottling works, foundries and machine shops. Here is located the Iowa Soldiers' Home, supported in part by the Federal Government. Among the educational institutions is St. Mary's Institute (Roman Catholic), a commercial and business school. Marshalltown was settled in 1860 and three years later incorporated as a town, receiving its city charter in 1868. The city was named in honor of Chief Justice John Marshall. Population in 1920, 15,731.

Marsh Gas. See FIRE DAMP.

Marsh Hawk, a bird of the Hawk and Eagle Family, known also as the harrier for its persistence in hunting its quarry. The male hawk, which measures nearly two feet in length, may be known by its bluish-gray back, white underparts, spotted with brown, grayish breast, white rump, and gray tail obscurely barred with dark gray. The female has the upper parts brown and the under parts buff with brown streaks. This handsome hawk is an inhabitant of the meadows and marshes, where it may be seen flying low over the ground in search of field Rodents. The marsh hawk does not molest poultry and is a valuable friend to the farmer. The nest, which is a foot or more in diameter, is placed on the ground or on a platform ten inches high, usually in wet meadows or swamps. It contains four to six bluish-white eggs.

Marsh Mallow, a coarse herb of the Mallow Family of the same genus as the hollyhock. It was once planted in gardens, but has escaped, and its large rose-colored blossoms are among the most noticeable wild flowers. The root is used for making mucilage. See MALLOW.

Marsu"pia'lia, an order of Mammals whose distinguishing characteristic is the possession by the female of an external pouch in which she retains the young for some time after birth. The young are born alive, but in a very immature and helpless state; they are at once transferred to the pouch, which is generally located abdominally, and are there cared for until they are able to provide for themselves. Even after they are able to find their own food, the young frequently return to the mother's pouch if surprised or frightened. The pouch is always large enough to hold the entire family. The Kangaroo, Opossum and Wombat families are members of this order. See KANGAROO; OPOSSUM; WOMBAT.

Mar'ten, a valuable fur-bearing animal of the Weasel Family, known in many species. The general color of the thick, soft coat is a rich brown, becoming lighter below. The body is long, the legs short and the claws sharp, as befits an animal whose home is in trees. It makes its prey of birds, squirrels and insects. The fur, when secured between November and March, is valuable, and trappers of Canada, especially in the Hudson Bay region, find great profit in it. This Canadian species is the pine marten, or Canadian sable. A European marten, having a white breast, is locally known as the beech marten or stone marten, and an American species, rare except in dense forests of Canada, where it is remarkable for its size and mischievous robbing of traps in which less cunning animals have been caught, is known as Pennant's marten or the fisher marten.

Martial, *Mar' shal,* **Law,** the exercise of governing power by military authorities in cases where civil and criminal law are superseded by military control. The jurisdiction under martial law is vested in a distinct tribunal, known as a court-martial, appointed by some superior officer. Martial law is not a written law, but arises out of a necessity, either in case of invasion of a foreign country by belligerents, or where, by the force of internal dissension, the regular civil authority of a country or locality is partly or wholly overcome. Under the constitutional system of the United States it is held by the Supreme Court that a state Legislature may proclaim martial law when demanded for the public safety.

Mar'tin, a bird of the Swallow Family. The purple martin is one of the most familiar birds on account of its acquired habit of nesting in houses provided by man. Originally the martins deposited their three to five white eggs in holes in trees, and probably do so now in remote localities. Martins may be distinguished from other swallows by their large size (eight inches), dark purple body and brown wings and tail. The female is browner, with only a gloss of purple on the head and back. Martins are valuable birds because they feed upon many kinds of injurious insects, and they should be constantly encouraged to nest about orchards and farms. In the fall they congregate in great flocks before migrating to the South.

Martin, Homer Dodge (1836-1897), an American landscape painter, born at Albany. He was one of the great trio of American landscape painters, holding rank with Inness and Wyant, and was a member of the National Academy of Design. While visiting in Europe he came under the influence of the Barbizon School, and he spent several years in France. His work shows a poetical interpretation of nature; his color is subdued. The Metropolitan Museum, New York, contains many of his best-known canvases, including *Lake George, Westchester Hills, A Mountain Brook, View on the Seine, Autumn on the Susquehanna* and *Trouville at Night.* The Century Club of New York possesses his *Adirondacks, Lighthouse at Honfleur* and *High Tide at Villerville.*

Martineau, *Mar' ti no,* **Harriet** (1802-1876), an English author, born at Norwich, England. The family professed Unitarian views. After her father's death she was forced to earn a living, and, since a growing deafness precluded her from teaching, she turned to writing. She visited America in 1834 and won unpopularity because of her decided views in favor of the abolition of slavery. After traveling on the Continent she became an invalid, but her health was restored by her undergoing a course of mesmerism. She passed from Unitarianism to agnosticism, although she never expressly and openly declared herself in favor of philosophical atheism. Her life, characterized by sincerity and industry, was ended in the peace and quiet of her tiny farm at Ambleside. She wrote *Society in America, Western Travel, Deerbrook, The Playfellow, Life in the Sick Room, Letters on Mesmerism, Eastern Life, Past and Present, History of England During the Thirty Years' Peace,*

Letters on the Laws of Man's Nature and Development (written together with H. G. Atkinson) and *Biographical Sketches.*

Martineau, James (1805-1900), an English clergyman, born at Norwich. He was educated for the ministry at the Unitarian Manchester College, graduating in 1827 and being ordained to the Presbyterian ministry the following year, in Dublin, where he began preaching. His next charge was in Liverpool, and while serving here was appointed professor of mental and moral philosophy at Manchester New College. In 1857 he took up his residence in London, whither the college had been removed in 1853, and in 1868 became its principal. He received honorary degrees from Harvard, Leyden, Edinburgh, Oxford and Dublin and ranks as one of the eminent Unitarians. He wrote, among other works, *The Rationale of Religious Inquiry, Types of Ethical Theory* and *The Seat of Authority in Religion.*

Martinique, *Mar" ti neek',* an island of the West Indies lying between Dominica and St. Lucia in the long chain known as Lesser Antilles. It has an area of about 380 sq. m. and is a rugged mass of volcanic rock made irregular by several groups of volcanic mountains, the highest among which is Mont Pelée. The valleys and mountain slopes are very fertile, and where not under cultivation bear forests of rank growth. There are many swiftly-flowing streams, few of which may be called rivers. The Lamentin is the only one of value for navigation. The climate is healthful and pleasant. The island produces sugar, cocoa, coffee and tobacco for export.

There are several excellent harbors protected by projecting peninsulas; the chief of these is Fort de France, which is also the capital; Le Robert, Trinité and Grande Anse are other cities of importance. Until the eruption of Mont Pelée in 1902, St. Pierre was the largest city of the island, but at that time the city with its 30,000 inhabitants was entirely destroyed. Martinique was settled in 1635 by the French, although it was among the Spanish discoveries of 1493. It was captured by the British in 1794 but became French again within a decade. Its government is administered by a governor and a general council. The island has been visited by many tornadoes and volcanic eruptions. Population, 182,100.

Martinsburg, W. Va., a city and the county seat of Berkeley Co., 74 m. n.w. of Washington, D. C., on the Baltimore & Ohio, the Cumberland Valley and other railroads. It is situated in the Lower Shenandoah Valley at the base of Little North Mountain. The district is especially well adapted to fruit growing, peaches and apples being the most important crops. Valuable slate and stone quarries are worked in the vicinity and there are extensive timber tracts in the surrounding section. Among the industrial plants are railroad repair shops, wagon factories, several lumber mills, lime works, grain elevators and extensive manufactories of hosiery, clothing and woolen goods. The leading institutions of the city are the Berkeley Female Seminary and the King's Daughters' Hospital. The Federal Building is a fine structure, erected at a cost of $100,000. A settlement was made here previous to the War of Independence and named Martinstown, in honor of Col. Thomas Bryan Martin. In 1778 the place was incorporated. During the Civil War it was occupied by the forces of both sides. Population in 1920, 12,515.

Martin's Ferry, Ohio, a city of Belmont Co., nearly opposite Wheeling, W. Va., on the Ohio River and on the Wheeling & Lake Erie, the Baltimore & Ohio and the Pennsylvania railroads. It is situated in a region noted for its abundance of iron, coal and limestone. The city has large blast furnaces, glassworks, engine and machine works, tin mills, a stove foundry, box and cooperage works and shovel works. The place was incorporated as a village in 1865 and a city charter was granted in 1885. Population in 1920, 11634.

Mar'vel, Ik, *Ike.* See MITCHELL, DONALD GRANT.

Marx, Karl (1818-1883), the founder of modern socialism, born at Treves, Germany, of Jewish parents. He was educated at Bonn and Berlin, and in 1842 became editor of a Liberal paper. A year later he went to Paris in the interest of another paper, and in 1845 to Brussels; here he assisted in organizing the German Workingmen's Association which was later connected with the *Communistenbund,* for which Marx and Engels wrote their noted exposition of communism. In 1848 Marx went to Cologne and established a paper, the revolutionary character of which led to his banishment from Germany the following year. He sought to establish himself in Paris, but was forced to leave and went to London, which was thereafter his home. He became correspondent for the New York *Tribune, Putnam's Monthly* and other periodicals, some of his articles being published in pamphlet form. In 1864 Marx was instrumental in organizing the International Workingmen's Association. He died in London. See SOCIALISM.

Mary I (1516-1558), Queen of England, daughter of Henry VIII and Catharine of Aragon. She was declared illegal after Catharine's death, and her father even forced her to sign a declaration that he was the supreme head of the Church in England. During the reign of her brother, Edward VI, she lived in retirement. She succeeded him in July, 1553. Mary immediately restored the Catholic worship in England and did her utmost to restore the property her father had taken from the Church. Her marriage with Philip II of Spain was very unpopular, and when insurrections broke out, Princess Elizabeth was accused of conspiracy and placed in the Tower. Mary joined Philip in a war against France, by which the English lost Calais.

Mary II (1662-1694), Queen of Great Britain, born at St. James's Palace, London. She was the eldest daughter of James II and Anne Hyde, and was married to William, Prince of Orange, when she was only 15 years old. When her father was forced to abdicate his throne and flee she joined her husband in England, and in 1689 became with him joint ruler in Great Britain.

Maryland, *Mer' i land,* THE OLD LINE STATE, one of the South Atlantic States, is bounded on the n. by Pennsylvania and Delaware, on the e. by Delaware and the Atlantic Ocean, on the s. and s.w. by Virginia and on the s. and w. by West Virginia.

SIZE. The greatest length from east to west is 240 m. The greatest breadth from north to south is 125 m. The area is 12,327 sq. m., of which 2386 sq. m. are water. Maryland is about the size of Massachusetts, Connecticut and Rhode Island, and one-third the size of Indiana. It is the 41st state in area.

POPULATION. In 1920 the population was 1,449,661. From 1910 to 1920 there was a gain in population of 154,315, or 11.9 per cent. There are 145.8 inhabitants to the square mile and the state's rank in population is 28.

SURFACE. Chesapeake Bay divides the state into two unequal parts, generally known as the Eastern Shore and the Western Shore. The surface of the Eastern Shore is low and level, having an average elevation of about 50 ft. above tidewater. The highest point, near the head of the bay, does not exceed 100 ft. That part of the Western Shore between the bay and the Potomac River is also low, its highest point not exceeding 125 ft. West of this region the surface is undulating and contains ranges of hills varying in altitude from 300 to 700 ft. and separated by beautiful valleys. The western part of the state is crossed by the Blue Ridge and Allegheny mountains, some of whose peaks have altitudes exceeding 2400 ft. The highest elevation within the state is Backbone Mountain in Garrett County, 3700 ft. high.

RIVERS. The rivers of the Eastern Shore are short and small, and all flow into Chesapeake Bay. The most important are the Elk, the Sassafras, the Chester, the Choptank, the Nanticoke, the Wicomico and the Pocomoke. The riv-

ers of the Western Shore are larger. The chief streams are the Potomac, belonging to both Maryland and Virginia; the Gunpowder, the Patapsco, the South, the Severn and the Patuxent. The Susquehanna enters the northern part of the state before reaching Chesapeake Bay.

CLIMATE. Owing to the influence of Chesapeake Bay the greater part of the state has a mild and equable climate. The winters are short and seldom severe, and the heat of summer is tempered by sea breezes. The western part of the state is subject to more extreme changes in temperature and has longer and colder winters and hot summers. The average summer temperature for the eastern part of the state is 75°, and the average winter temperature 37°. The annual rainfall is 46 inches in the eastern part; in the western part it averages 38 inches.

MINERALS AND MINING. Valuable deposits of bituminous coal occur in Garrett, Allegany and Washington counties, and coal mining is the chief mineral industry, the output amounting to over 4 million tons yearly. Next in importance are the brick, tile and pottery industries. Kaolin and clay of excellent quality occur in large quantities in Harford and Baltimore counties. Marble, granite, gneiss, sandstone and other building stone are quarried in the counties bordering on the head of Chesapeake Bay. The white marble of Baltimore County is especially valuable for monuments and statuary. The pillars in the front of the Capitol at Washington and most of the Washington Monument are of this stone. A variegated marble of excellent quality known as Potomac marble occurs in Frederick County. There are valuable deposits of iron ore in Allegany and Garrett counties.

AGRICULTURE. Since its beginning as a colony agriculture has been the chief industry of Maryland. In colonial days tobacco was the staple crop and little else was raised. Now diversified farming is practiced and a variety of crops is grown.

MARYLAND

Soil. The soil in the Eastern Shore is a light loam, especially suited for growing garden vegetables, but along the western shore of Chesapeake Bay and in the central part of the state it is somewhat clayey and very fertile.

Products. Tobacco is still raised in the central part of the state. The most important field crops are wheat, corn, hay, Irish potatoes and sweet potatoes. The farms in the Eastern Shore are chiefly devoted to truck gardening and fruit growing. In the hill regions of the Western Shore dairying is an important industry, and the income from live stock is also considerable. In the Appalachian regions thousands of acres of mountain land have been planted in apple orchards, and the raising of this fruit is becoming an important industry.

FISHERIES. Chesapeake Bay has over 200 sq. m. of oyster beds, and oyster fishing is one of the important industries of the state, furnishing employment for over 7000 small vessels. The annual value of oysters taken is about $5,000,000, of which about one-half is for canned oysters (See OYSTER). The waters of the bay also abound in shad and other fish, so that the annual value of the sea food taken is somewhat over $10,000,000.

MANUFACTURES. The chief manufacturing industries are located in and about Baltimore, which is one of the leading manufacturing cities in the country. The manufacture of textiles, of clay products, including brick, tile and pottery, the canning of fruits, vegetables and oysters and other shellfish, and shipbuilding constitute the chief manufacturing industries. The production of iron and steel, making machinery, meat packing and the manufacture of tobacco products are also important.

TRANSPORTATION AND COMMERCE. The largest ocean steamers can enter the harbor of Baltimore. Chesapeake Bay also has many good harbors for vessels of lighter draught, and the Potomac is navigable as far as Washington, so that the state has excellent transportation facilities by water. There are over 1400 m.

of railway within the state. Most of the lines are controlled by the Baltimore & Ohio and the Pennsylvania systems. Railways extend through the state in all directions, providing adequate transportation facilities. Baltimore is the chief railway center.

GOVERNMENT. The governor and the attorney-general are elected for four years and the comptroller of the treasury for two years. The treasurer is elected by the Legislature for two years. Appointments by the governor must be confirmed by the Senate. The Legislature consists of a Senate of 27 members and a House of Delegates of 101 members. Senators are elected for four years and delegates for two. One-half of the senators retire every two years. Sessions of the Legislature are biennial and limited to 90 days.

The state is divided into eight judicial circuits. In each circuit, except the one which comprises Baltimore, one chief judge and two associate judges are elected by popular vote for terms of 15 years. In Baltimore City, the eighth circuit, there are seven courts and eleven judges. The eight chief judges, one from each circuit, constitute the Court of Appeals, which is the court of last resort. Minor causes are heard by justices of the peace.

EDUCATION. The state maintains an excellent system of public instruction. Revenue is raised by general taxation, and the school fund thus secured is distributed by the state comptroller to the city of Baltimore and the counties according to the number of persons between 5 and 20 years of age. Separate schools are provided for white and colored children. Textbooks are free and the law requires nine months of school each year, but in a number of counties they are kept open for ten months. There is an efficient system of high schools receiving liberal state aid. State normal schools are maintained at Baltimore and Frostburg and there is an institution for the training of negro teachers in Prince Georges County. The higher institutions of learning not under control of the state are Johns Hopkins University at Baltimore; the University of Maryland and Goucher College at Baltimore; St. John's College at Annapolis; the agricultural college in Prince Georges County; Western Maryland College at Westminster; Washington College at Chestertown; and Jacob Tome Institute at Port Deposit. The United States Naval Academy is at Annapolis.

STATE INSTITUTIONS. The hospitals for the insane are at Sykesville, Spring Grove, Crownville and Cambridge. Schools for the blind and deaf are at Baltimore and Frederick. The school for feeble-minded children is at Owings Mills. The state penitentiary is at Baltimore. There is also a house of refuge for boys and one for girls.

CITIES. The chief cities are Annapolis, the capital; Baltimore, Cumberland, Hagerstown, Frederick, Cambridge and Salisbury.

HISTORY. Maryland, named for Henrietta Maria, Queen of Charles I, was secured from the English Crown by George Calvert, first Lord Baltimore, for himself and his heirs. It was to be a refuge for persecuted Catholics and a haven of religious forbearance. Cecilius, second Lord Baltimore, made the first settlement at St. Mary's, in 1634. Difficulties with Virginia over trading posts were not settled for almost 50 years, and then in favor of Maryland. The boundary dispute with the Penns was ended in 1767 by the establishment of Mason and Dixon's Line (See MASON AND DIXON'S LINE).

Maryland was one of the last to join the United States (1790), holding out till the large states surrendered their claims to the Western territories (See ORDINANCE OF 1787). During the first half of the 19th century, extensive internal improvements, such as canals and railroads, were made. In 1844, the first American telegraph was built from Washington to Baltimore. Though a slave state, Maryland did not secede. Of its soldiers, about 47,000 fought for the North and about 12,000 for the South. Consult William H. Browne's *Maryland* in the American Commonwealths Series.

GOVERNORS. Thomas Johnson, 1777-1779; Thomas Sim Lee, 1779-1782; William Paca, 1782-1785; William Smallwood, 1785-1788; John Eager Howard, 1788-1791; George Plater, 1791-1792; James Brice, 1792; Thomas Sim Lee, 1792-1794; John H. Stone, 1794-1797; John Henry, 1797-1798; Benjamin Ogle, 1798-1801; John Francis Mercer, 1801-1803; Robert Bowie, 1803-1806; Robert Wright, 1806-1808; James Butcher, 1808-1809; Edward Lloyd, 1809-1811; Robert Bowie, 1811-1812; Levin Winder, 1812-1815; Charles Ridgely, 1815-1818; Charles Goldsborough, 1818-1819; Samuel Sprigg, 1819-1822; Samuel Stevens, 1822-1825; Joseph Kent, 1825-1828; Daniel Martin, 1828-1829; Thomas King Carroll, 1829-1830; Daniel Martin, 1830-1831; George Howard, 1831-1833; James Thomas, 1833-1835; Thomas W. Veazey, 1835-1838; William Grason, 1838-1841; Francis Thomas, 1841-1844; Thomas G. Pratt, 1844-1847; Philip Francis Thomas, 1847-1850; Enoch Louis Lowe, 1850-1853; Thomas Watkins Ligon, 1853-1857; Thomas Holliday Hicks, 1857-1861; Augustus W. Bradford, 1861-1865; Thomas Swann, 1865-1868; Oden Bowie, 1868-1872; William Pinkney Whyte, 1872-1874; James Black Groome, 1874-1876; John Lee Carroll, 1876-1880; William T. Hamilton, 1880-1884; Robert M. McLane, 1884-1885; Henry Lloyd, 1885-1888; Elihu E. Jackson, 1888-1892; Frank Brown, 1892-1896; Lloyd Lowndes, 1896-1900; John Walter Smith, 1900-1904; Edwin Warfield, 1904-1908; Austin L. Crothers, 1908-1912; Phillips Lee Goldsborough, 1912-1916; E. C. Harrington, 1916-1920; A. C. Ritchie, 1920—.

Maryland, University of, at Baltimore. This institution, being gradually evolved from the Medical College of Maryland, was opened in 1807, and includes a law school opened in 1814 and reorganized in 1869, a dental department opened in 1882 and the Maryland College of Pharmacy opened in 1841. St. John's College, a nonsectarian college for men, opened in 1789 at Annapolis, became the department of arts and science in 1907. St. John's receives an appropriation of $35,000 annually from the state and gives for each county one free scholarship and one scholarship covering all expenses. It has a library of some 15,000 volumes and other properties valued at about $300,000. The college of pharmacy is the only department that admits women. The four professional schools in Baltimore report a total enrollment of 800. See JOHNS HOPKINS UNIVERSITY.

Mary Mag'dalene, a character of the New Testament, so named, probably, because Magdala, a village on the Sea of Galilee, was her birthplace. She is first made known to us by Luke, who names her as one of a group of Galilean women who "ministered unto the Lord of their substance." Mary had been delivered by Christ of seven devils, and she not only followed him through life, but stood by the cross at the crucifixion and was the first to look upon the risen Lord on the Resurrection morning. She was not, however, the "woman who was a sinner," mentioned in *Luke vii, 37.*

Mary Stuart (1542-1587), Queen of Scotland, generally known as Mary Queen of Scots. She was the daughter of James V. of Scotland. Upon the death of her husband, Francis II of France, Mary returned to Scotland, where her charm and beauty soon won for her the affection of her people. On account of her Catholic training, however, she was not welcomed by the most zealous of the Reformers, the stern John Knox making her life miserable by his severe denunciation of her. In 1565 Mary became the wife of her cousin, Lord Darnley, hoping thus to unite all Catholic claims to the English throne, as Darnley was next in succession to herself. The murder of Darnley, in which the Queen was suspected of having a part, helped to turn her people against her, and after her marriage with Bothwell, who was accused of her husband's murder, she was imprisoned and forced to abdicate in favor of her infant son. Escaping to England, she threw

herself upon the protection of her cousin, Queen Elizabeth, who placed her in prison, keeping her in confinement for 19 years. During this time Mary was the center of numerous plots to place her on the English throne, and, being finally declared guilty of complicity in one of these, she was beheaded.

Mary, The Virgin, the mother of Christ. She was a maid of the tribe of Judah and of the royal family of David. Joachim and Anne, according to most ancient tradition, were her parents. According to *Luke 1, 26-38,* the angel Gabriel was sent to her by God to announce that she had been chosen to be the mother of the coming Messiah. Though rarely mentioned in the Gospels, it is known that she was near her Son during all of his public work. The place of Mary's death is unknown. The Roman Catholic Church venerates her with special honor.

Masaccio, *Mah zaht' cho,* or **Tommaso Guidi,** *Gwe' de,* (1401-1428), one of the great pioneers in the development of Italian art. Born in Florence.

Masaryk, Thomas G. (1850-), the first president of Czecho-Slovakia. He was born in Moravia, his father held a minor position on one of the imperial estates. His parents could give him but two years schooling, but by his own exertions he finally secured a university education, first at Vienna, then at Leipsic. In 1882 he was appointed professor in the New Bohemian University at Prague. He soon was recognized as an authority on Czech history. He served for a time as one of the representatives of Bohemia in the Austrian parliament in Vienna, but he resigned and devoted himself exclusively to advancing the interests of the Czech movement. He is well known in America, his wife being an American, and he delivered a course of lectures in the University of Chicago. Being an active leader in the cause of Bohemian independence he was condemned to death by the Austrian government and fled for protection to the United States. He was active in securing the recognition of Czecho-Slovakia as one of the belligerent powers in the war.

Mascagni, *Mahs kahn' ye,* **Pietro** (1863-), an Italian operatic composer, born at Leghorn. He was partly educated for the law, but discontinued his legal studies and began the study of music at the Institute Luigi Cherubini. Later he studied at the Milan Conservatory, and in 1890 appeared his *Cavalleria Rusticana,* which, with its tuneful melodies, attained wide popularity. Mascagni was for eight years director of the Pesaro Conservatory.

Mase'field, John (1875-), an English poet, story-writer and dramatist, born in Shropshire. His schooling was irregular, and several years of his boyhood were spent on the sea, where, as a sailor "before the mast," he gained a thorough knowledge of the seaman's life. During these years of wandering he spent several adventurous months in New York City. After his return to England, Masefield experienced the turning point in his career in meeting the poet William Butler Yeats, who profoundly influenced him and encouraged him to write. The result was a series of stories, poems and plays that have put him in the front rank of English men of letters of the 20th century. His prose stories of the sea—*Captain Margaret, A Mainsail Haul* and *On the Spanish Main*—are not only fascinating narratives, but also vivid and accurate descriptions of sea life. His narratives in verse, including *The Everlasting Mercy, The Widow in the Bye Street, Salt Water Ballads* and *The Story of a Round House,* show him to be a poet of high order, possessed of the gift of sympathy for the humble toiler and the lowly born. As a playwright he deals with the grim facts of life with uncompromising realism, and he is a master of dramatic technique. His dramas include *The Tragedy of Nan, The Campden Wonder* and *The Tragedy of Pompey the Great.* He has also written the novels *Multitude and Solitude* and *The Street of Today;* and *Martin Hyde,* a tale for boys.

Masho'naland", a province of Southern Rhodesia, South Africa, lying between the Zambesi and Sabi rivers. It is a mountainous country chiefly noted for its production of gold and other minerals. Salisbury, the chief town, is surrounded by reminders of ancient mines. The population is 497,165, about 4000 of whom are Europeans. See RHODESIA.

Mask, a covering for the face for protection or disguise. In the former case the mask is made of wire and is used in ball playing and fencing. Masks have been used in the rites of savages and in festivals of nearly all primitive peoples. In Greek drama, which grew out of the festival, masks were used from the beginning. Metallic mouthpieces were provided for the purpose of augmenting the power of the voice. The use of masks in the modern theater is chiefly confined to pantomime. The use of masks at costume balls is of Italian origin. Death masks are plaster impressions of the face of a person made after death.

Ma'son, James Murray (1798-1871), an American lawyer and legislator, born on Mason's Island, Va. In 1818 he graduated at the University of Pennsylvania, practiced law in Winchester, Va., and became a prominent figure in politics. He was a member of the United States House of Representatives from 1837 to 1839 and of the United States Senate from 1847 to 1861. In the Senate he defended slavery, was a strong advocate of states' rights and drafted the Fugitive Slave Law. In 1861 he resigned his seat in the Senate to take an active part in the Confederacy, and was sent to England to enlist her sympathies and secure help. On his way he was taken prisoner by Captain Wilkes of the United States navy, but was released upon the request of England. Mason proceeded to carry out his commission after his release, but without success. See TRENT AFFAIR.

Mason, Lowell (1792-1872), an American composer, born in Medfield, Mass. He early taught and composed music, and when 20 years of age went to Savannah, Ga., where he was soon leading choirs. His publication of *Boston Handel and Haydn Collection of Church Music,* in 1822, was so successful that he returned North, and in Boston, after 1827, began vocal instructions. He taught juvenile classes gratuitously according to the Pestalozzian method, founded the Boston Academy of Music, and published collections of music and glee books. He is especially remembered for his numerous hymn tunes, which are still in use.

Mason and Dixon's Line, the boundary line between Maryland and Pennsylvania as marked out, between 1763 and 1767, by two English surveyors, Charles Mason and Jeremiah Dixon. From the time that Pennsylvania was established in 1681, this boundary was a source of irritation until a tentative agreement was decided upon in 1732. A convention in 1760 confirmed this agreement and the two English surveyors were engaged to survey the line between the two colonies. The boundary line, at about parallel 39° 43′, was marked by milestones, and each five miles by a larger stone, on which were cut the arms of William Penn and Lord Baltimore. This line was popularly considered the dividing line between the slave and the free states until the Civil War, and is still frequently used to denote the separation line between the sections of the country known as North and South.

Mason Bee, a small, dark-colored bee of the group known as the solitary bees. The female alone survives the winter and begins building, in the spring, a walled nest of sticks and pebbles glued together with her own saliva. The nest consists of a series of cells, each smooth within and stored with honey and pollen, and the repository of a single egg. A layer of cement covers the entire structure, which thus forms a solid, well-built house. Unlike the honeybees and the bumblebees, the mason bees have no castes, the only classes being the ordinary ones of male and female. They are commonly found in the south of France. See BEE.

Mason City, Iowa, a city and the county seat of Cerro Gordo Co., 72 m. n.e. of Fort Dodge and 115 m. n.e. of Des Moines, on the Chicago & North Western, the Iowa Central, the Chicago, Milwaukee & St. Paul and other railroads. The Mason City & Clear Lake Railway, an electric line, connects the town with Clear Lake, a pleasant resort 10 m. distant. Chief among the industries are stone quarrying and the manufacture of Portland cement, brick, tile, lime, sash, doors and flour. The city has a considerable wholesale trade in groceries and fruits. At Mason City is located Memorial University, a coeducational institution, founded in 1900. There is also an Odd Fellows' Orphans' Home here. Settled in 1853, Mason City was incorporated as a town in 1870; it received its city charter in 1881. Population in 1920, 20,065.

Masons. See FREE MASONS.

Massachusetts, *Mas" a choo' sets,* THE OLD BAY STATE, one of the New England States, is bounded on the n. by New Hampshire and Vermont, on the e. by the Atlantic Ocean, on the s. by Rhode Island and Connecticut and on the w. by New York.

SIZE. The greatest length from east to west is 184 m., and the average breadth is 47 m. The total area is 8266 sq. m., of which 227 sq. m. are water. Massachusetts is about twice the size of Connecticut, the fourth New England state in area and a little larger than New Jersey. It is the fifth smallest state in the Union. There are a number of islands belonging to the state which are situated in Buzzard's Bay and Vineyard Sound. The most important of these are Nantucket, Martha's Vineyard and the Elizabeth Islands. Massachusetts Bay on the east and Buzzard's Bay on the south give the state a coast line of over 300 m.

POPULATION. In 1920 the population was 3,852,356. Between 1910 and 1920 there was a pain of 485,940 in population, or 14.4 per cent. There were 479.2 inhabitants to the square mile. Massachusetts is the most populous of the New England States. In 1917 the population was estimated at 3,775,973.

SURFACE. The western part of the state is crossed by two parallel ranges of mountains. The eastern is the Hoosac and the western is the Taconic. These ranges are an extension of the Green Mountains and collectively are known as the Berkshire Hills. In general these mountains are low, with rounded summits and wooded slopes, and are separated by beautiful valleys.

East of these mountains and stretching almost to the center of the state is the Valley of the Connecticut. Its sides slope gradually to the river. The valley contains a number of isolated peaks, of which Mt. Tom and Mt. Holyoke are the most conspicuous. East of the Connecticut Valley is a plateau whose greatest elevation is about 1100 ft. This extends eastward with a gentle slope to meet the land forming the coast plain. The southeastern part of the state is low and marshy, but an irregular elevation of land forms Cape Cod, which encloses Massachusetts Bay. The irregular coast contains a number of good harbors, the most noted being those of Boston, New Bedford, Salem and Gloucester.

RIVERS AND LAKES. The Connecticut River crosses the western part of the state from north to south and is the largest stream within its borders. Its leading tributaries from the west are the Green, Deerfield and Westfield, and from the east, Miller's River and the Chicopee. The western part of the state is drained by the Housatonic, which flows through Connecticut and into Long Island Sound. The Merrimac crosses the northeastern part and receives the Concord and the Nashua. The Taunton, flowing into Narragansett Bay, is the most important stream in the southeastern part of the state.

Massachusetts has no large lakes, but many small bodies of water and clear ponds are found among the hills and valleys. Most of these have wooded shores, and while they are of no industrial importance they add much to the beauty of the scenery, and some of them

are valuable as sources of water supply to the neighboring cities.

SCENERY. The western part of the state is picturesque and beautiful, especially in the valleys of the Connecticut, Housatonic and Deerfield rivers. From Cape Ann southward the coast line is rocky with occasional high bluffs. Along Cape Cod it is low and sandy. Nantucket, Martha's Vineyard and the Gosnold Islands are noted summer resorts.

CLIMATE. Along the coast the climate is variable and subject to extreme and frequent changes. In general, in this region the winters are mild, though damp, and the summers are cool, owing to the influence of the sea. Farther inland the winters are mild and the summers warm, as a rule. The average annual rainfall for the state is about 48 inches.

MINERALS AND MINING. Massachusetts is one of the leading states in production of emerald and granite. The granite quarries are in the eastern counties. In Hampden County are valuable quarries of sandstone. Limestone is quarried in the western part of the state and clay suitable for making brick is quite generally distributed.

AGRICULTURE. Although Massachusetts was originally an agricultural state, for many years agriculture has been second to manufactures. The farms are small and the production of milk, garden vegetables, poultry and eggs employs the attention of most of the farmers. Many cities and towns within the state furnish a ready market and the farmers receive good returns on their investments. Dairy products lead in value and amount to over $12,800,000 annually. The income from poultry is about $1,500,000. Cereal crops are not relatively important. There are some nurseries in the western part of the state. Tobacco is grown in the Connecticut Valley, and the land comprising Cape Cod is noted for its cranberries.

FISHERIES. Massachusetts is one of the leading states in the production of fish. Fishermen from Gloucester, Marblehead and other coast towns search the Grand Banks for cod, which are taken in large quantities. Mackerel, halibut, herring, blue fish and other food fish are taken in large numbers off the shore. Oyster and clam fishing are also important. Gloucester is the most important fishing port in the country. Nantucket, Provincetown and New Bedford were formerly important whaling ports and whale fishing is still engaged in to some extent. At Woods Hole is one of the most complete stations of the United States Fish Commission. The fisheries of the state employ about 100,000 men and about $5,400,000 is invested in the industry.

MANUFACTURES. Manufacturing is the leading as well as one of the oldest industries in the state. A number of the manufacturing industries which have grown to vast proportions had their beginnings in Massachusetts. The first cotton mills in the country were built at Beverly in 1788. The first power loom, constructed by F. C. Lowell of Boston and put into operation at Waltham in 1814, revolutionized the cotton industry in the entire country. The first real woolen factory was built at Byfield in 1794. The smelting of iron, the manufacture of paper and other important industries also had their beginnings in this state.

At present Massachusetts is known for the extent and variety of her manufactures. She leads in the manufacture of cotton goods, worsteds and woolens, boots and shoes, rubber shoes and writing paper, and is second only to Rhode Island and New York in the manufacture of jewelry. Railway cars, locomotives, electrical and other machinery, furniture, drugs, carpets, silks and numerous other articles are manufactured in large quantities. At Waltham is the largest watch factory in the world. Lowell, Lawrence and Fall River are the great centers for the cotton industry. Lynn and Brockton lead in the manufacture of boots and shoes and at Holyoke are some of the largest paper mills in the country.

TRANSPORTATION AND COMMERCE. Boston is the leading seaport of New Eng-

land and has direct steamship connection with all the leading ports of the world. Her coastwise trade is also extensive. The railways of the state are under the control of the New York, New Haven, & Hartford, the Boston & Maine and the New York Central systems. Lines of railway extend through the state in all directions, and every city inhabitant lives on a railway line or in close proximity to one. There are also numerous electric lines joined into systems, so that one can travel long distances on them. These lines supplement the steam railways and greatly increase the transportation facilities. The public highways are well cared for and in most localities are in excellent condition.

The commerce is very extensive. Manufactured products are sent to all parts of the United States and to many foreign countries. Raw material for these manufactures is imported. Foodstuffs, manufactures from foreign countries, works of art and other luxuries are also important. All these conditions make Massachusetts one of the leading commercial states in the country.

GOVERNMENT. The present government is a modification of the system instituted by the Pilgrims and Puritans. The original state constitution of 1780 has been twice revised and amendments have been made from time to time. The right of suffrage is conferred on all male citizens, 21 years of age and over, who can read and write the English language, and are neither paupers nor imbeciles. The executive department consists of the governor, lieutenant-governor, eight councilors, secretary of the commonwealth, treasurer and receiver-general, auditor of accounts and attorney-general, all elected annually by popular vote. The councilors are elected by districts.

The Legislature, called the General Court, consists of a Senate of 40 members, and a House of Representatives of 240 members, all elected annually. There are several commissions, the members of which are appointed by the governor and confirmed by the council. The most important of these are the board of agriculture, the board of education, railroad commission, the land and harbor commission, boards of health, lunacy and charity and the board of arbitration and conciliation, whose duties are to deal with labor disputes.

The judicial department comprises a Supreme Court consisting of a chief justice and six associate justices, and a Superior Court consisting of a chief justice and 17 associates. All these judges are appointed by the governor and confirmed by the council. The judges of these courts hold court in the various counties. Each county also has its courts of probate and insolvency, and cities have such police and municipal courts as they require.

EDUCATION. The first public schools in the United States were established in Massachusetts by a colonial law enacted in 1647. The first college in the country was founded in Cambridge in 1636 (See HARVARD UNIVERSITY). From the earliest times to the present day Massachusetts has given special attention to public education, and her school system in extent, completeness and efficiency is second to none.

The state board of education has advisory powers, and through its commissioner, who has the duties and authority of a state superintendent of public instruction, maintains general supervision over the school system. The law requires a public school to be maintained in every city and town. These schools are under the control of local boards. The minimum course of study is defined by law and the schools as a rule are carefully graded and furnished with complete equipment. Attendance is compulsory between the ages of seven and fourteen. Outside of the larger cities the schools are grouped into supervisory districts, and each district is in charge of a district superintendent. The state maintains ten normal schools for the training of teachers and a number of schools for training in the industrial arts and the trades.

The most important higher institutions of learning are Harvard University, Mas-

sachusetts Institute of Technology, Amherst College, Williams College, Worcester Polytechnic Institute, Clark University, Boston University, Tufts College and Holy Cross College. The following colleges for women are also important: Mt. Holyoke, Wellesley, Smith, Radcliffe and Simmons.

STATE INSTITUTIONS. The schools for the instruction of the deaf are at Boston, Northampton and Randolph. There is a school for the feeble-minded at Waltham. The Massachusetts School for the Blind and Perkins Institute is at Watertown. The hospitals for the insane are at Danvers, Medfield, Northampton, Taunton, Westborough and Worcester. The prison is at Charlestown and the reformatory for men is at Concord. The reformatory for women is at Sherborn.

CITIES. The chief cities are Boston, the capital; Worcester, Fall River, Lowell, Cambridge, Lynn, Lawrence, New Bedford, Springfield, Haverhill, Gloucester, Somerville, Holyoke and Brockton.

HISTORY. Massachusetts, from an Algonquin phrase meaning "at the great hill," was, according to Icelandic Sagas, visited by Norsemen about 1000. The Cabots sailed along the coast in 1497. Gosnold made a brief settlement, on one of the Elizabeth Islands, in 1602. Twelve years later, John Smith made a map of the coast. The first permanent settlement, at Plymouth, 1620, was made by English Separatists who for 12 years had been self-exiled in Holland (See PLYMOUTH COLONY). In 1628 John Endicott settled Salem, which with Boston, established in 1630, and various other villages, later constituted Massachusetts Bay Colony. Some of the leaders of this colony were among the most conspicuous characters of early American history (See ENDICOTT, JOHN; WINTHROP, JOHN; DUDLEY, THOMAS). Its religious intolerance, however, drove into exile Roger Williams, Anne Hutchinson and John Wheelright. Quakers likewise were banished, and later 20 supposed witches were put to death at Salem. A long series of Indian wars, from 1637 to 1760, caused great suffering. In 1692, the Province of Massachusetts Bay in New England was granted a new province charter. For further details of early Massachusetts history, see NEW ENGLAND CONFEDERATION; PHILIP, KING; WITCHCRAFT.

During the next century, despite troubles with the French and Indians (See FRENCH AND INDIAN WARS), struggles with the Crown over the charter, and boundary disputes with neighboring colonies, Massachusetts grew rapidly in population and in commercial and military power. It led in the pre-Revolutionary struggle. Its valorous soldiers and diplomatic statesmen contributed much to the successful issue of the war: Massachusetts furnished over one-fourth of the American troops, and it was the scene of many of the most important events of the early struggle (See BOSTON MASSACRE; BOSTON TEA PARTY; LEXINGTON, BATTLE OF; BUNKER HILL, BATTLE OF). The first state constitution, 1780, abolished slavery. The crushing taxes necessitated by the Revolution led to Shays's Rebellion, 1786 (See SHAYS'S REBELLION). By a small majority, Massachusetts ratified the Constitution (January, 1788). It was strongly Anti-Federalist till 1797. The state was closely associated with the Hartford Convention. Leaders of the anti-slavery movement, among them Garrison, Phillips and Sumner, came from Massachusetts, which furnished the Federal army nearly 160,000 men. Since the Civil War, the state has dealt with reforms regarding education, prohibition and labor legislation. Consult C. F. Adams, *Massachusetts: Its Historians and Its History*.

GOVERNORS. John Hancock, 1780-1785; James Bowdoin, 1785-1787; John Hancock, 1787-1793; Samuel Adams, 1793-1797; Increase Sumner, 1797-1799; Moses Gill, 1799-1800; Caleb Strong, 1800-1807; James Sullivan, 1807-1808; Levi Lincoln, 1808-1809; Christopher Gore, 1809-1810; Elbridge Gerry, 1810-1812; Caleb Strong, 1812-1816; John Brooks, 1816-1823; William Eustis, 1823-1825; Levi Lincoln, 1825-1834; John Davis, 1834-1835; Edward Everett, 1836-

1840; Marcus Morton, 1840-1841; John Davis, 1841-1843; Marcus Morton, 1843-1844; George N. Briggs, 1844-1851; George S. Boutwell, 1851-1853; John H. Clifford, 1853-1854; Emory Washburn, 1854-1855; Henry J. Gardner, 1855-1858; Nathaniel P. Banks, 1858-1861; John A. Andrew, 1861-1866; Alexander H. Bullock, 1866-1869; William Claflin, 1869-1872; William B. Washburn, 1872-1874; Thomas Talbot, 1874-1875; William Gaston, 1875-1876; Alexander H. Rice, 1876-1879; Thomas Talbot, 1879-1880; John Davis Long, 1880-1883; Benjamin F. Butler, 1883-1884; George D. Robinson, 1884-1887; Oliver Ames, 1887-1890; John Q. A. Brackett, 1890-1891; William E. Russell, 1891-1894; Frederic T. Greenhalge, 1894-1896; Roger Wolcott, 1896-1897; Roger Wolcott, 1897-1900; W. Murray Crane, 1900-1903; John L. Bates, 1903-1905; William L. Douglas, 1905-1906; Curtis L. Guild, 1906-09; E. S. Draper, 1909-11; E. N. Foss, 1911-14; D. I. Walsh, 1914-16; S. W. McCall, 1916-18; C. Coolidge, 1918-20; C. R. Cox, 1920—.

Massachusetts Bay, an indentation of the eastern coast of Massachusetts, extending 42 m. in length from Cape Ann to Plymouth Harbor, with a breadth inland, opposite Boston, of 22 m. Often the name is made to include Cape Cod Bay. There are several smaller bays, forming the important harbors of Boston, Lynn, Salem, Gloucester and Marblehead. The shores are irregular; the southern, sandy and marshy; the northern, rocky.

Massachusetts Bay Colony, a settlement established by 60 English Puritans under the leadership of John Endicott at the present site of Salem, Mass., in 1628. The Council of New England had previously granted to Endicott and others a strip of land from the Atlantic to the Pacific, from three miles north of the Merrimac to three miles south of the Charles. From the first the colony was independent of England in the management of its own affairs, being empowered to elect its governor, deputy-governor and 18 assistants, and to make any rules "not repugnant to the laws of England." However, authority was not formally changed to America until 1630. The colony grew rapidly, but sickness, dissension and mismanagement later caused great suffering. As a result of religious persecution, the most vigorous in American history, many of the most prominent members of the colony left and established settlements in New Hampshire, Rhode Island and Connecticut.

Massachusetts Institute of Technology. Opened for students in 1865, this Institute has won an international reputation. Its aim has been to fix in the students' minds by laboratory experiments, which they themselves perform, the important laws of science brought out in the classroom; and to develop each individual so that he shall seek knowledge for its own sake, and become less and less dependent upon his instructors. In many phases of technical education, it has done the pioneer work of the country. It has a graduate school, offers some summer courses, and enrolls a few young women. It is nonsectarian. The library contains about 130,000 volumes and 50,000 pamphlets. Its assets are about twenty millions of dollars. There are some 2,000 students and about 7,000 graduates. The Architectural Department of the Institute is maintained in Boston but the rest of its work is conducted in the great group of buildings occupied in 1916 on a site of about fifty acres in Cambridge, bordering on the Charles River basin.

Massage, *Ma sahj'*, a form of treatment which consists in rubbing or kneading the body to stimulate circulation and so remove waste tissue. It is practiced by educated operators who must understand the anatomy of the nerves and muscles. Treatments are said to have quieting effect upon the nerves and remedial or hygienic effect upon the skin and upon the system in general. A practitioner is called a masseur or masseuse.

Massasoit, *Mas' a soit"*, (about 1580-1661), an American Indian chief, born

in Massachusetts. He was sachem of the Wampanoags, who occupied the southern part of Massachusetts. This tribe was reduced by a scourge from 30,000 to 300. Soon after the founding of Plymouth Colony, Massasoit, accompanied by 60 of his warriors, visited the colony and concluded a treaty of peace with Governor Carver which lasted for 50 years. Massasoit was a man of just and kindly nature, a lover and teacher of peace.

Mas'sillon, Ohio, a city of Stark Co., 9 m. w. of Canton and 69 m. s. of Cleveland, on the Tuscarawas River and the Ohio Canal and on the Baltimore & Ohio, the Pennsylvania and the Wheeling & Lake Erie railroads. There is a large trade in coal, sandstone, live stock and grain. The industrial plants produce stationary and portable engines, iron bridges, bar iron, pumps, sash and blinds, furnaces, glass bottles, steel tubing, flour, pottery, foundry and machine-shop products, farm implements and creamery products. Massillon is the seat of the state hospital and asylum for the insane. There are many fine public buildings. It was founded in 1825, incorporated as a village in 1853 and chartered as a city in 1868. Population in 1920, 17,428.

Mas'tersing"er (German, *Meistersinger*), a member of the society of German singers established at the end of the 13th century. The institution originated in the assembling of the burghers, who used to meet on winter evenings to read the poems of the minstrels. Some of the hearers began to compose verses of their own, others followed their example and before long a legalized corporation was established. Charles IV (1346-1378) gave them a charter. They held their meetings on certain days, when they criticized each other's productions in accordance with a formal set of rules. Unlike the minnesingers, whose poetry was mainly chivalric in character, the mastersingers wrote spiritual songs or rhymed versions of Scriptural stories. Correctness was the chief end to be attained. These societies flourished especially in the 14th and 15th centuries and continued in Nuremberg to the 18th century. The last society to be dissolved was that of Ulm, which held its final meeting in 1839. The greatest of the mastersingers was Hans Sachs, who lived in the 16th century.

Mas'tiff, a class of dogs, which includes such breeds as the bulldog, boarhound, great Dane, bull terrier and pug. All are strong and solidly built, with powerful shoulders, short, sleek coats and thin tails. The head has a muzzle of moderate or short length, drooping ears, protruding lower jaw and a sagging upper lip. They are excellent watchdogs and are faithful to death to a trust. Many stories are told of their sagacity in caring for children and in protecting their master's property from theft and fire; some are trained in the care of flocks and are said to rival shepherd dogs in this regard.

Mas'todon, a name applied to an extinct genus of elephant, remains of which are found in all parts of the world in Tertiary formations from the Niocene into the Pleistocene period. It is the oldest and most primitive type of the Elephant Family. In general structure it closely resembled the Asiatic elephant of today and the average size was nearly the same as that of the modern elephant, though the body may have been bulkier. The body was protected with fur; the tusks curved upward and back, sometimes occurring in both jaws. The teeth were of different structure and the forehead was flatter. The animal fed on herbage, bark and leaves.

Match'es, small splints of wood, coated at one end with an inflammable mixture, which ignites by friction. It is estimated that the civilized people use 3,000,000 matches every minute of the day of 24 hours. About one-half of this vast number is used in the United States. If we estimate the population of the country at 100,000,000, this gives an average of 22 matches a minute for every man, woman and child. In a single year the match industry cut 225,000,000 ft. (board measure of timber) from the

Great Lakes region. One of the great match plants consumes about 200,000 ft. of lumber a day, and the census of 1910 gave the annual value of matches made in the United States at $11,353,000.

MANUFACTURE. The splints are made of soft wood, usually pine or basswood, and the best grade of lumber, free from knots, is necessary. In the American match factory all the work, except placing the matches in boxes, is done by machinery. Basswood splints are made from veneer, which is a shaving just the thickness of the match. The logs are cut into sections five feet long. These are steamed to soften them, then placed in a lathe and cut into veneer, which is a long, thin sheet of wood. This sheet is cut into splints the size of a match, which are then dried and dropped into a shaker that arranges them in line side by side. They are then placed in the stacking machine, which is a perforated plate moving on an endless chain. One end of the splint is inserted in the perforations, and as the plate moves along, the other end is dipped first in paraffin, then in the other mixtures, which make the head of the match. The plates are then placed where the heads can dry.

A more recent method, requiring pine lumber, employs an automatic machine, which of itself practically converts the lumber into matches. The lumber for use in this machine is sawed into two-inch planks, which are then cut into sections the length of a match. These sections are fed into the machine at one end, and the finished matches are turned out at the other at the rate of 720,000 an hour, or 12,000 per minute, when they are placed in match boxes. This machine requires seven operators, five of whom are employed in packing the matches into boxes.

HISTORY. According to the best authorities, the friction match was invented by John Walker of England in 1829. Others, however, claim that friction matches were made in the United States by Joseph and Jacob Miller in 1825. The first matches of this sort contained a mixture of sulphur and phosphorus. Later chlorate of potash took the place of sulphur. Safety matches, which can be ignited only by rubbing them on a prepared surface, are of more recent origin. The principle of this match is that some of the ingredients necessary for ignition are in the head of the match and the others in the coating on the side of the box. The manufacture of ordinary phosphorus matches is one of the most dangerous of occupations, because the phosphorus poisons the workman and produces incurable diseases. In 1912 the United States Government enacted a law prohibiting the manufacture of these matches in the country. Their manufacture has also been prohibited in most European countries.

Maté, *Mah' ta,* or **Paraguay,** *Pair' a gwa,* **Tea,** an evergreen shrub of the Holly Family extensively used in South America in the place of tea. The shrub grows to the height of a small tree and bears smooth, shiny leaves and small, almost stemless, white flowers. The tea is prepared from the dry leaves and shoots, but is frequently adulterated with the leaves of other plants and is rarely sold pure. The drink is made in nearly the same manner as ordinary tea and is generally drunk from a bowl or gourd, called a maté, by means of a tube provided with a metal strainer. The name of the dish came later to be applied to the drink. Maté is unpleasant to the uninitiated, but is used in large quantities in Brazil. It contains the same principle, caffein, as tea and coffee, and has the same invigorating effect. It is produced chiefly in Paraguay. A related North American species, called cassena tea, was once similarly used by the Creek Indians.

Mate'rialism (from Latin *materia,* matter), in philosophy, the doctrine that explains the universe in terms of matter and motion. It is opposed both to natural realism and to idealism, the former of which occupies the "common sense" position that minds and material objects both have valid existence; while the latter makes matter a corollary of mind. Materialism, on the other hand, reduces all mental processes to physical

changes in the nervous system. While natural science is not necessarily allied with materialism, it is easy to see how the almost exclusive occupation of science with the facts of nature, and its attempts to explain phenomena by natural causes, constitute a temptation in that direction. The chief periods when materialism has been especially influential are the Pre-Socratic and Post-Aristotelian in Greece, the 18th century in France and the third quarter of the 19th century in Germany. In English thought, materialism has been more uniformly influential from Hobbes to the present time. Even when materialism is not held in an absolute form, it still may color thinking by the subordination of mental and spiritual to material phenomena and interests. See PHILOSOPHY; IDEALISM; REALISM.

Math"emat'ics, that branch of science which has to do with the relations of magnitudes and numbers. At present it is understood as including two great departments: pure mathematics, or subjects which take up the mechanical operations with abstract numbers; and applied mathematics, or those subjects which apply the operations of pure mathematics to practical problems. The first class includes arithmetic, algebra, geometry, trigonometry, calculus and analytic geometry; applied mathematics is best represented in mechanics, physics, geodesy and astronomy. As with all sciences, no hard and fast line can be drawn between the two divisions, since they are closely related, and the modern tendency is to make use chiefly of those principles of pure mathematics which find practical application.

The branches of pure mathematics were first developed, and they began when the science of numbers was studied. The earliest mathematical records are those of the Egyptians, who seemed to have a well-developed numerical system and a system of fractions, though a complicated one, before 2000 B. C. Mensuration, both arithmetical and geometrical, had, of necessity, also been developed. Later the science seems to have advanced more as an applied science, and spread to the Babylonians and Phœnicians, who made use of it in their trade relations. In Greece, about 600 B. C., is probably to be found the real beginning of pure mathematics as a science. In the schools of Pythagoras, Hippocrates, Plato, Euclid and Archimedes mathematics and philosophy occupied the prominent places, and as the two developed together, mathematics became more than ever a science of reason; at the same time a geometry, differing little from that of the present, was also developed. A little later Persia, Arabia and India produced works in mathematics, among which is an especially well-written book on algebra, by Omar Khayyám, who is less known as a scientist than as a poet.

In Europe, Italy, always the patron of arts and sciences, gave much attention to arithmetic and algebra, and with the aid of French scholars, as Descartes, brought those two departments into their present form. Descartes also presented his analytical geometry, while other mathematicians, both French and German, were computing tables of logarithms and studying geometry with renewed zeal. The greatest addition to mathematical study since that time was the simultaneous announcement by Leibnitz, in Germany, and Newton, in England, of the invention of calculus. Since their time mathematical study has advanced mainly through the study of the fundamental principles laid down by the founders of the science, and an expansion of these along practical and theoretical lines.

Math'er, Cotton (1663-1728), an American divine and writer, eldest son of Increase Mather, born in Boston. He graduated at Harvard in 1678, and was ordained at Boston. A restless, credulous, praise-loving man, he was interested in strange phenomena, and outstripped everyone in fanning popular belief in witchcraft (See WITCHCRAFT). His works include the *Magnalia,* a Church history of New England from 1620 to 1698, valued chiefly today for the insight it gives into the intellectual

life of its author; *Essays to Do Good; Parentator,* a life of his father; and a number of books on witchcraft. At his death, Cotton Mather was considered the foremost scholar and writer that America had thus far produced.

Mather, Increase (1639-1723), a colonial minister, born at Dorchester, Mass., and educated at Harvard and at Trinity College, Dublin. He became pastor of the new North Church at Boston in 1664, and in 1685 became president of Harvard, though still retaining his pastorship. He resigned the presidency in 1701. He was active in opposing the tyranny of Charles II and James II and obtained a new charter for the colony from William III, which proved satisfactory. He was a prolific writer and published a large number of works.

Math'ews, Shailer (1863-), an American educator and editor, dean of the Divinity School of the University of Chicago, born at Portland, Me. He was educated at Colby College, Newton Theological Institution and the University of Berlin. Since 1894 he has been connected with the University of Chicago, as associate professor (1894-97) and professor (1897-1905) of New Testament history and interpretation, and as professor of historical and comparative theology since 1906. From 1899 to 1908 he was junior dean of the Divinity School, and became dean in 1908. He was editor of *The World To-Day* from 1903 to 1911. In 1913 he was elected president of the Federal Council of the Churches of Christ. Among his writings are *The Social Teaching of Jesus, A History of New Testament Times in Palestine, The Messianic Hope in the New Testament, The Church and the Changing Order* and *The Gospel and the Modern Man.*

Matter, that which occupies space and which we can detect by one or more of our bodily senses. The so-called luminiferous ether, which is supposed to pervade all space, even to some extent that occupied by common matter, is not included in the above definition of matter; it may be a form of matter but it has never been perceived by the bodily senses. Matter exists in one of three general states, solid, liquid and gaseous; but they are not always distinct from each other. See VAPOR; GAS; ELASTICITY.

Matterhorn, *Maht' er horn,* a mountain of the Pennine Alps, located between the Canton of Valais and the Val d'Aosta in Italy. It is 14,780 ft. in height, and rises impressively and abruptly far above the surrounding range. Since 1865, when Whymper, Hudson and Lord Douglas ascended it, it has no longer offered the former dangers of ascent. A hut for shelter has been erected at a height of 12,526 ft. In 1891 a mountain railway was opened which carries passengers to an altitude of over 5000 ft. This has since been extended by an electric railway extending to an altitude of 10,290 ft. and forming the highest electric railway in the world. The power is generated by a mountain stream formed by the melting of the Findalen Glacier. Each train can carry 110 people.

Matthews, (James) Brander (1852-), an American author and educator, born in New Orleans, La. He graduated at Columbia College in 1871 and from the Columbia Law School two years later, and was made professor in the same university in 1892. He became secretary of the Simplified Spelling Board in 1906. His writings include dramatic criticism (French in tone), comedies (literary, rather than dramatic) and short stories. He was one of the founders of the Authors Club and of The Players, assisted in organizing the American Copyright League and has been a member of the American Academy of Arts and Letters. Among his works are *French Dramatists of the Nineteenth Century, Americanisms and Briticisms, Aspects of Fiction, Introduction to the Study of American Literature, His Father's Son, Vignettes of Manhattan, Studies of the Stage, Margery's Lovers, Recreations of an Anthologist, Development of the Drama* and *A Study of the Drama.*

Matthews, Stanley (1824-1889), an American jurist, born in Cincinnati, Ohio. After graduating at Kenyon College in 1840, he was admitted to the bar and practiced law in Cincinnati. He served successively as county judge, state senator and United States attorney for southern Ohio (1858-61). From 1861 to 1863 he was in the Union army, after which he became judge of the Cincinnati Superior Court. In 1877 he succeeded John Sherman as United States senator, and in 1881 was appointed associate justice of the United States Supreme Court, holding this position until his death.

Matthew, *Math' u,* **Saint,** one of the Twelve Apostles of Christ, the author of the first book of the New Testament (See GOSPELS, THE). He was the son of Alpheus, and before his conversion was named Levi. His office was that of a publican, or officer of the Roman customs. Of his history after his call to be an apostle, we know very little. In *Acts i, 13,* we learn that he was one of those assembled in the "upper room" at Jerusalem after the Ascension; tradition makes him a preacher in that city for 15 years and a missionary to Arabia, Ethiopia, Macedonia and other places.

Mattoon', Ill., a city of Coles Co., 100 m. s.e. of Peoria and 56 m. w. of Terre Haute, Ind., on the Illinois Central, the Cleveland, Cincinnati, Chicago & St. Louis and other railroads. There is a good trade in broom corn, grain, fruit and live stock. Chief among the industrial establishments are railroad repair shops, broom factories, carriage and wagon works, flour mills, grain elevators and hay presses. The town has a Carnegie public library and reading room and the Old Folks' Home of the I. O. O. F. Mattoon was settled and incorporated in 1855 and is governed under a revised charter of 1867. Population in 1910, 11,456. In 1920, 13,449.

Maumee' River, a river of the United States formed at Fort Wayne, Ind., by the junction of the St. Mary's and St. Joseph's rivers. It flows in a northeasterly direction into Ohio and enters Lake Erie through Maumee Bay. It is 150 m. long and navigable to Maumee Rapids, a distance of 12 m. The Miami and Erie Canal, which connects Lake Erie with the Ohio River, begins at the head of navigation. Toledo is at the mouth of the river.

Mau'na Lo'a, the largest volcano in the world, occupying a large part of the central and southern portion of Hawaii. It rises gradually from the sea to a height of 13,760 ft., terminating in a group of craters, which together form an enormous caldron a mile and a half in diameter and 1000 ft. in depth. The volcano is almost continuously active and violent eruptions are of frequent occurrence. Its discharge of lava is greater than that of any other volcano in existence. During the eruption of 1880-81 a stream was emitted which in places reached a width of three miles, and had an extent of 50 miles.

Maupassant, *Mo" pa" sahn',* **Henri René Albert Guy de** (1850-1893), a French novelist and poet born at the Château of Miromesnil. He studied at Yvetot and at Rouen, and was later clerk in the cabinet of public instruction, where it is said that his style was declared unsatisfactory. Maupassant's first productions attracted the attention of the novelist Flaubert, to whom the young writer served a severe seven years' term of apprenticeship. Then followed the publication of the works which won for him the rank of master of the short story. In style, power of observation and marvelous insight he has remained unequaled among the French naturalists. Peasants and servants are his favorite types. His works include *Mademoiselle Fifi, A Life, Tales of Day and Night, Father Milon, Pierre and Jean* and *Yvette.* A translation of 13 of his best short stories has been published under the title *The Odd Number.* It includes the stories, admirable for their construction and insight into human character, *The Diamond Necklace* and *A Piece of String.*

Mauritius, *Mo rish' i us,* once called Ile de France, an island of the Indian

Ocean lying 530 m. e. of Madagascar. It has an area of 720 sq. m. and in physical features is a mountainous island surrounded by coral reefs. The Black River Peak and Pieter Botte, a peculiar isolated rock, are the highest peaks and have an altitude of nearly 3000 ft. Along the coast there are fertile plains where fruits, sugar cane, rice, maize, manioc, coffee, pepper and vegetables are grown. The native trees are chiefly tropical. The chief industries are the manufacture of sugar, rum and drugs and the preparation of fiber for cloth making. Port Louis is the capital and largest city. It has been a British possession since 1810. The island is famous as being the scene of Saint-Pierre's *Paul and Virginia*. The population is 375,400, about 30,000 of whom are Indian and the rest of French or mixed descent.

Maury, *Mor' y,* **Matthew Fontaine** (1806-1873), an American naval officer and hydrographer, born in Spottsylvania County, Va. In 1825 he entered the navy, but an accident in 1839 made him a cripple, whereupon he entered scientific work at the Washington Observatory, of which he became superintendent. In addition to papers on the Gulf Stream, ocean currents and great circle sailing, he wrote a valuable *Physical Geography of the Sea*. He became commodore in the Confederate service of the Civil War, later went to Mexico, Russia and England, taught physics at Virginia Military Institute and was president of Alabama University.

Mavor, James (1854-), a distinguished educator, born in Scotland and educated at Glasgow University. In 1892 he was called to the University of Toronto. Since then he has investigated European labor colony systems and immigration and has inquired into the Workmen's Compensation Acts in Europe, into the municipal administration of the United States and into Canada's capacity as a producer of wheat and her facilities for transporting it. He also conducted the negotiations which led to the Fisher Copyright Act of 1900. Professor Mavor has written widely on social and economic topics, and on the subjects of relief of the poor and of railway administration, he ranks among the most eminent of English authorities.

Max Adeler. See CLARK, CHARLES HEBER.

Max'im, Hiram Stevens (1840-1916), an American inventor, born in Maine. He is the originator of the firearms that bear his name. His first gun was loaded and fired automatically by means of power secured from its own recoil. A gun was finally perfected that fired 600 shots per minute. Maxim has succeeded so well that his guns are now used more or less by every civilized nation. He also invented searchlights, an incandescent light and a smokeless powder. He was knighted in 1901 and became a citizen of England. He has received many decorations and is a member of several scientific societies.

Maxim, Hudson (1853-), an American inventor and engineer, born in Maine. In 1888 he took up the business of ordnance and explosives, and was the first to make smokeless powder in the United States, developing the Maxim-Schupphaus smokeless powder adopted by the government. His other inventions include "maximite," the first high explosive to be fired through heavy armor plate; "stabillite," a smokeless powder of superior ballistic results; "motorite," a self-combustible for driving automobile torpedoes; and a torpedo ram. He is a member of various scientific organizations. See TORPEDO.

Max"imil'ian (1832-1867), Archduke of Austria and Emperor of Mexico. He served in the Austrian navy and in 1857-9 was viceroy of the Lombardo-Venetian Kingdom. In 1864 he accepted the crown of Mexico. In spite of his wise efforts to develop and consolidate his dominions he failed to preserve order. The French troops, sent by Napoleon to support the Emperor, were withdrawn because of the protest of the United States Government. Maximilian made a brave effort to maintain his position, but was betrayed, tried by court-martial and shot.

Maximilian I (1459-1519), Holy Roman emperor, born at Wiener-Neustadt, near Vienna. He married Mary, daughter of Charles the Bold of Burgundy, an alliance which secured him greater wealth and influence. In 1493 he succeeded his father, Frederick III, as emperor. He checked the private wars that had wasted the country during his father's reign, and organized Germany into ten circles, each governed by a captain and force of soldiers, for the preservation of the peace. He also did much to advance the interests of art and education generally. He sought to extend his empire, in which endeavor he was more successful by diplomacy than by war. Maximilian was the greatest of the Hapsburg line during the medieval period.

Max Müller, *Mil' er,* **Friedrich** (1823-1900), a German philologist and Orientalist, born at Dessau. His father was one of the great German poets, Wilhelm Müller. At Leipsic, Berlin and Paris, respectively, Friedrich studied Sanskrit, philology and the science of comparative religion. In 1846 he came to England to edit the *Rigveda,* under the patronage of the East India Company, settling in 1848 at Oxford, where the work was printed. He was appointed deputy professor of modern languages at Oxford in 1850 and was made master of arts the next year. During his years of residence here he gained an extended reputation as a comparative philologist and Orientalist, and in 1868 was made professor of comparative philology on the establishment of that chair. He has written many valuable books, among which are *History of Ancient Sanskrit Literature, Origin and Growth of Religion, The Science of Religion* and *Natural Religion.* He is a recognized authority on the sacred literature of the East.

Max O'Rell'. See BLOUET, *Bloo" eh',* PAUL.

Max'well, William Henry (1852-), an American educator, born in Ireland. He graduated from Queen's University, Galway, in 1872, and taught in the Royal Belfast Academical Institution and in the Ladies' Collegiate Institution of that city. Coming to America in 1874, he engaged in journalistic work on the New York *Tribune* and the *Herald,* and for five years was managing editor of the Brooklyn *Times,* serving meanwhile as a lecturer on history and civil government in the evening high schools. Elected associate superintendent of the public schools of Brooklyn in 1882, he became superintendent in 1887; and since 1898 has been superintendent of the schools of Greater New York. Dr. Maxwell is the author of several English texts for schools, and of numerous articles on educational subjects.

May, the fifth month of the year, containing 31 days. The word is from a Latin root meaning greater, referring to the growth of vegetation during the month, but some say referring to the older men who were honored on this day among the Romans; and others refer it to Maia, the mother of Mercury. It has always been a month of festivities among all peoples. The practice in England during the Middle Ages of going to the woods for flowers and hawthorn (the may) was called "going-a-maying." The doors and windows of the houses were decorated, and the people danced around the Maypole. See MONTH; YEAR.

May, Phil (1864-1903), an English comic newspaper artist. When 15 he entered an architect's office, which he soon left to join a troupe of strolling actors, for whom he made comic portraits for advertising purposes. Thus awakened to his talent, he went to London, where he contributed to the *St. Stephen's Review.* Later he was on the staffs of the *Sydney* (Australia) *Bulletin,* the London *Graphic* and *Punch.* An excellent draughtsman, his boy sketches in the slums were especially admirable. *Phil May's Sketch Books* and *Phil May's Annual* contain his best work.

May Apple. See MAN'DRAKE.

May Beetle. See JUNE BUG.

Mayflower Compact, the agreement made on Nov. 11, 1620, in the cabin of

the *Mayflower,* in Provincetown Harbor, by the Pilgrim Fathers. Before landing, they vowed themselves a "civil body politic" and pledged obedience to the laws which they should make as such. See PILGRIMS.

May Fly, Lake Fly or **Shad Fly,** an insect of the order known as Ephemerida. There are several different species, members of which are abundantly found upon the shores of lakes, large rivers and streams, where, at twilight, they dance about, especially near artificial lights, and cling closely to the clothing of boaters. May flies are rarely found inland, unless blown from their usual haunts. At twilight the May fly emerges from the water, where it has

MAY FLY

existed in the larval stage, crawls up the bank, splits its skin and comes forth a dancing, winged creature, whose life is generally ended before the dawning of the next day. This brief, adult existence has, however, been preceded by two or three years of larval life in the bed of the stream. There the May fly larva is a wingless, aquatic animal which crawls about under stones in search of food. In this stage it is called a nymph and has a soft, six-legged body. During its months under water, it grows rapidly, develops its wings underneath an enveloping skin and molts in some instances a score of times. Unlike any other insect, the May fly molts after it has spread its wings; this occurs from 1 to 24 hours after its first appearance above the surface.

The adult May fly is frail, with a pair of large, gauzy forewings and a comparatively small pair of hind ones. Sometimes this last pair is entirely wanting. The most striking characteristics are two or three long, slender filaments extending from the abdomen, and the large compound eyes upon the head. The mouth is rudimentary or entirely lacking, for in its brief adult existence, it does not eat at all. See INSECTA.

Mazarin, *Maz" a reen',* **Jules** (1602-1661), a cardinal and the eminent minister of Louis XIV. He was born in Italy, educated at Rome by the Jesuits and appointed nuncio to France in 1634. Richelieu recognized his ability and offered him service for the King. He later became a naturalized citizen of France and was made a cardinal in 1641. The next year he succeeded Richelieu as prime minister. When Louis XIII died, his wife, Anne of Austria, retained Mazarin. He was unpopular with the people and hated by the nobles, and those two classes joined in the civil war, called the Fronde. Mazarin fled from the court, but returned in 1653, and for the next eight years remained ruler of France. His foreign policy was like that of Richelieu; he gained the alliance of Cromwell and brought the provinces of the Rhine under the leadership of France. He left an immense fortune at his death and bequeathed his magnificent library to the college named for him.

Mazzini, *Maht se' ne,* **Giuseppe** (1808-1872), an Italian patriot, born in Genoa. After studying at the University of Genoa he practiced law, and in 1827 began to publish literary and political papers. In 1830 he joined the Carbonari, a secret political society, becoming at once active and influential. In 1831 Mazzini organized the league of Young Italy, the main aim of which was the union of Italy, and in 1837 he took up his residence in London and for several years incessantly agitated the cause of Italian liberty and union. He assisted in the

organization of Garibaldi's expeditions of 1860, 1862 and 1867, in 1870 returned to Italy, and was arrested at Gaeta, remaining a prisoner until Rome was occupied by the Italian army. His great service to the cause of Italian liberation and union lay in his awakening the love of country and freedom in the Italian youth and keeping alive the spirit of insurrection.

Mead, *Meed,* **Larkin Goldsmith** (1835-1910), an American sculptor, born at Chesterfield, N. H. During the first year of the Civil War he supplied illustrations from the scene of the engagement for *Harper's Weekly.* Subsequently he removed to Italy, where the greater part of his work was done. Among his principal works are a statue of President Lincoln, at Springfield, Ill.; *Ethan Allen,* in Statuary Hall of the Capitol, Washington; and *The Father of Waters,* at New Orleans.

Meade, *Meed,* **George Gordon** (1815-1872), an American soldier, born in Cadiz, Spain, and educated in Philadelphia, Washington, Baltimore and at West Point. He served during the Mexican War on the staff of General Taylor and then of General Scott. Later, as captain, he was in charge of surveys on the Northern lakes. In August, 1861, he was commissioned brigadier-general of volunteers and acted conspicuously at Mechanicsville, Gaines's Mill and Frazier's Farm. He participated in the second Battle of Bull Run and was wounded at Antietam, where he commanded a corps. In June, 1862, he was commissioned major-general of volunteers, in this capacity distinguishing himself at Fredericksburg and Chancellorsville; and the following summer, as commander of the Army of the Potomac, in succession to Hooker, he won on July 1, 2 and 3 the notable victory of Gettysburg (See GETTYSBURG, BATTLE OF). Subsequently as major-general in the regular army, he was in command of the Army of the Potomac during Grant's Virginia campaign of 1864-1865. Following the war he commanded the Department of the Atlantic, the Department of the East and that military district which included Florida, Georgia and Alabama. Consult Pennypacker's *General Meade,* in the Great Commanders Series.

Meadow Lark, a bird of the Blackbird Family. This handsome bird, which is about the size of the robin, may be known by its bright yellow breast and under parts, the black spot on its breast, and its back and sides, streaked with black, brown and white. When in flight the white outer tail feathers are very conspicuous. Meadow larks are birds of the open fields, building their partly-arched nest on the ground hidden in the grass. The nest contains four to six brown-spotted eggs. Two or three broods of young are raised each season. In

MEADOW LARK

the fall the meadow larks gather in large flocks and choose more or less marshy feeding grounds. Like other birds of the family, the meadow lark is a valuable destroyer of insects, especially grasshoppers. The song is very sweet and seems to say "can't see me," or "spring o' the year." The meadow lark is found from Newfoundland to the Gulf of Mexico, and westward to the Great Plains. It winters from Massachusetts and Illinois southward.

Meadville, *Meed' vil,* **Pa.,** county seat of Crawford Co., 36 m. s. of Erie and 105 m. n. of Pittsburgh, on French Creek and on the Erie and the Bessemer & Lake Erie railroads. The Meadville & Theological College (Unitarian) and the Allegheny College (Methodist), organized in 1815, are located here. There are also several hospitals and fine mu-

nicipal buildings. Meadville is an important market of a fertile and populous county which is rich in petroleum and natural gas. It has oil refineries, machine shops, iron and boiler works, foundries and manufactories of engines, carriages, farm implements and railroad cars. The town was settled in 1788 and chartered as a city in 1866. Population in 1920, U. S. census, 14,568.

Mealy, *Meel' y,* **Bug,** an injurious insect of the Scale Insect Family. Unlike the other members of the family, this species excretes its wax in the form of a powdery substance resembling fine grains of flour. The body is flattened and of oval form; about the margin and especially at the extremities are peculiar projections which may aid in locomotion. Only the males are winged. Mealy bugs are common in the greenhouses of northern United States; in Florida they have infested the orange trees and have been particularly troublesome to the sweet-potato crop. Mealy bugs may be destroyed by spraying plants with kerosene emulsion or a tobacco wash. See INSECTICIDE; SCALE INSECT.

Measles, *Me' z'lz,* an eruptive and contagious disease. It usually occurs but once in the life of an individual, and then in childhood. The disease develops about eight days after exposure to the infection and appears in the form of a rash on the face and neck, later spreading to all parts of the body. It is accompanied by fever and a generally weakened condition. The malady is of short duration, unless complications arise. During the period of convalescence care should be taken to keep the patient from taking cold, as serious trouble is often brought on by neglect at this stage of the disorder. Consult Koplik, *Diseases of Infancy and Childhood.*

Measuring Worm, Looper or **Inch Worm,** the larva or caterpillar of a moth belonging to the Geometrid, or Earth-Measuring, Family. Although these caterpillars are common, they are not noticeable because their colors are similar to those of the branches upon which they feed, and because, when disturbed, they are apt to stiffen and stand out from the branch like a dry twig. The measuring worms have a peculiar method of locomotion because of the loss of the first three pairs of prolegs (See CATERPILLAR). Only the anterior and posterior portions of the body are supported; thus the worm moves by clinging to the twig with its forelegs and then moving the hind ones up to them, in the meantime "looping" the central portion of the body to get it out of the way. Children watch the measuring worm as it crawls along the twig and imagine that it is determining the length of its journey; from this fancy have been derived its popular and its scientific names.

The measuring worm spins itself a cocoon, goes into an inactive state for a few days and soon after emerges as an adult. It is then a dull gray or tan-colored moth, with slender body and relatively broad wings.

Meat Packing, the industries of slaughtering animals and the preparation of different meats and other products from the carcasses.

SLAUGHTERING. Formerly each town had its own slaughterhouse, or abattoir, but now stockyards for the receiving, care and slaughtering of cattle, hogs and sheep are located at central points, the largest being at Chicago, Omaha, Kansas City, East St. Louis, St. Paul and New York. The animals are brought to these centers by trains and unloaded into yards. After they are purchased by the packers, they are driven up an inclined viaduct to the top of the building, where they are killed. By a variety of power-driven hoisting devices and conveying apparatus, they are carried downward from floor to floor, as the process of dressing proceeds, until the completely dressed carcass is delivered into the cooling rooms. The work requires a very large number of men, each of whom is trained to do one thing quickly and well. Such is the degree of skill attained that a hog is killed and completely dressed in less than eight minutes, and a steer in 45 minutes.

MEAT PACKING

Fresh Meat. The preparation of fresh meat is the most important branch of the meat-packing industry, and its great magnitude is due largely to the advantages of refrigeration and cold storage and the ability to ship the meat long distances in refrigerator cars. Refrigerator cars are owned and maintained by the packers, who get a rental from the railroad using them. These are kept cold by ice packed between the walls or in the top of the car, the temperature being kept at about 35° F. Meat shipped long distances in these cars arrives in a more palatable state than when first slaughtered. The care and maintenance of these cars is a special department of the packing industry and a very important one. The packers also maintain cold-storage plants at all centers of distribution to the local trade.

Curing Meats. Salting, smoking and drying were the original methods employed for the preservation of meats, and formerly the term *packing* was restricted to these methods, though it now includes all the processes employed by the modern packers. Modern methods of preserving meat differ but little from the older methods, but the business is carried on much more extensively. Because of this, greater care is taken and better sanitary methods are employed. The methods of curing different parts of the hog with salt are known as pickling, dry salting and smoking.

Pickling. In pickling hams, shoulders, etc., they are submerged in brine and kept under by weights so that the salt can be thoroughly absorbed by the meats, and when the brine becomes weakened, the meats are removed and placed in other receptacles with fresh brine. The usual time required for salting is from 30 to 45 days, the necessary time and the strength of the brine depending upon the cuts of the meat. Usually a small amount of sugar is added to the pickle.

Dry Salting. In dry salting, the meat is rubbed with salt, then piled in layers. A layer of meat is placed on the bench, then a layer of salt is spread over it and a second layer of meat placed over this, and so on until the piles are about three feet high. At the end of ten days the meat is repacked and again rubbed with salt, the process being repeated at ten-day intervals until the meat is cured. Dry salting is the method employed in England, and is sometimes called the "English cure."

Smoking. In smoking hams, shoulders, bacon and other meats, they are hung in brick compartments or smokehouses in tiers close together. A slow wood fire, usually of hickory or sugar maple, is built beneath, and the smoking is kept up for 12 to 48 hours. The meats are afterwards cooled, and finally wrapped and boxed for shipment. When intended for hot climates, the meats are wrapped in canvas, as well as in paper. This canvas is covered with a yellow paste consisting principally of some clay, and then dried, the object being to exclude the air and keep out vermin. Beef is cured by pickling in a similar manner to that described above. Dried beef is made of lean pieces of meat, which, after being pickled, are dried by smoking.

Canned Meats. For canning, the meat is trimmed from the bones, cut into small pieces and put into a curing pickle of salt, water and a little sugar, to which a small portion of saltpeter is added. After it has remained in this solution sufficiently long to get the degree of saltiness desired, it is cooked in hot water until thoroughly done; then, while hot, it is cut into proper sizes and automatically pushed into cans by machines made for this purpose. After the can has been weighed in order to get the proper quantity of meat in it, it is capped by a tin disk which is soldered over it. The cans of meat are now subjected to a further heating, after which they are washed, cooled and labeled.

By-Products. Meat packing, as practiced in the packing houses of the United States, includes not only meat preserving but the utilization of every part of the animal and the preparation of by-products, such as hides, hoofs, horns, bones, hair, fats, intestines and blood. In some

of the packing houses facilities are at hand to manufacture these by-products into leather, glue, buttons, combs, curled hair, soap, candles, oils, glycerin, etc. All bloods and fats are made use of, for sanitary reasons as well as for profit. From the stomach of hogs pepsin is made, and from the glands of hogs, sheep and cattle valuable medicinal preparations are obtained. All parts and scraps of the animals not used as above are ground up and cooked and employed as a constituent of fertilizers or chicken feed. The value of these by-products, amounting to from $1 to $2 per head for cattle, forms by no means a small part of the profit of the business.

GOVERNMENT INSPECTION. All animals are examined by government inspectors before they are slaughtered, and the meat is also carefully inspected after slaughtering. This inspection gives an assurance of the meat's being perfectly wholesome.

PRODUCTION. The United States leads all countries in meat production, its output being about one-third the world's supply. The number of animals slaughtered per year will average about 5,500,000 cattle, 30,000,000 hogs and 9,000,000 sheep. Chicago prepares nearly two-fifths of the meat produced in the United States. See BACON; BEEF; BEEF, EXTRACT OF; LARD; MUTTON; PORK; SAUSAGE; TALLOW.

Mecca, *Mek' a,* a city of Arabia, capital of the Turkish Province of Hedjaz, situated about 60 m. e. of Jiddah. The valley in which it lies is barren and sandy, and in the center of the city, on a lower level than the other buildings, stands the Sacred Mosque on an area which can hold 35,000 people. To this holy shrine come pilgrims of Mohammedan faith the Old World over, often to the number of 100,000, making Mecca an important religious center. These pilgrimages are the chief source of wealth and occupation to the inhabitants of the city, who let their rooms to the strangers, among whom are Malays, negroes, Indians, Persians, Turks, Egyptians and Chinese. The only manufactures are rosaries and pottery; there is some dyeing. The early history of Mecca is accounted for in Mohammedan legend. Non-Mohammedans are excluded from the city, and only a few Europeans are found here. Population, about 50,000.

Mechanical, *Me kan' i k'l,* **Equiv'alent of Heat,** the number of units of mechanical energy equivalent to one unit of heat. In the English system one British thermal unit equals 778 foot poundals of work. In the metric system one gram calorie equals 4.187 joules, or 41,870,000 ergs of work. The equivalence between heat and work was first scientifically established by the English physicist, James Prescott Joule, between 1843 and 1850. He measured the mechanical work required to heat a given amount of water a definite number of degrees, and arrived at a result very close to the accurate values just given. See HEAT; CALORIMETRY.

Mechanical Powers. See MACHINES, SIMPLE.

Mechanics, *Me kan' iks,* that branch of physics which treats of the motions of bodies and the effect of forces in causing or changing those motions. It includes a treatment of those cases where forces distort a body, causing it to change in size or shape, as when a gas is compressed or a spring is bent. It is usual to subdivide mechanics into kinematics and dynamics. See KINEMATICS; DYNAMICS.

Mechanicsville, *Me kan' iks vil,* **Battle of,** an engagement of the Civil War, fought June 26, 1862, at Mechanicsville, a few miles from Richmond, Va., between some 5000 Federals under Gen. Fitzjohn Porter, and 10,000 Confederates under Lee. The Confederates made two attacks upon the Union position, which was a strong one, but as Lee had divided his forces, he suffered defeat. Porter moved to Gaines's Mill, near Cold Harbor, during the night. The engagement at Mechanicsville began the "Seven Days' Battles" of the Army of the Potomac.

Mecklenburg, *Mek' len burg,* **Declaration,** a set of resolutions declaring for independence, purported to have been

adopted by a convention of delegates representing each militia company of Mecklenburg County, N. C., on May 20, 1775. The fact that the phraseology of the resolutions is very similar to that of the Declaration of Independence, adopted the next year by Continental Congress, has led to a discussion concerning the originality of the latter document. The weight of present historical authority is overwhelmingly against the authenticity of the Mecklenburg Declaration.

Mede'a, in Grecian mythology, a famous sorceress, daughter of Colchis, and niece of Circe. She assisted Jason in his search for the Golden Fleece and then fled with him in the Argo to Iolcus (See JASON; ARGONAUTS). The story of Medea is treated in *Medea,* the great tragedy of Euripides.

Med'ford, Mass., a city of Middlesex Co., 5 m. n.w. of Boston, on the Mystic River and on the Boston & Maine Railroad. The city has within its limits the villages of South Medford, Wellington, West Medford, Hillside and Glenwood. It is an attractive residential suburb of Boston. Tufts College (Universalist), founded in 1852, is located here. It has important industrial interests and manufactories of cotton goods, dyes, chemicals, brick, felt boots and novelties. There are large print works and a rum distillery. The city has several parks and contains a number of historical houses, including the Cradock House dating from 1634. Founded as Meadford in 1630, it became a town the following year. A city charter was received in 1892. Population in 1920, U. S. census, 38,687.

Me'dia, a country situated in the northern part of the Persian Empire. The Medes were the first of the Indo-Germanic race to play a permanent part in the world's history. They lived in the northern part of the Plateau of Iran and were closely allied to the Persians to the south of them, in language and religion. For a while they were under the power of Assyria, but they united in 708 B. C. and established their capital at Ecbatana. In 606 B. C., aided by the Babylonians, they captured and sacked Nineveh. They received as their share of the booty the eastern and northern mountain regions, reaching from the Persian Gulf to Asia Minor. They were checked, however, to the northwest by the expanding power of Lydia. The Persians under Cyrus the Great rose against the Medes. By 550 B. C. Cyrus had conquered them, and the country remained a part of the Persian Empire until the conquest of Alexander. From the death of Alexander until the time of Augustus, Media was a separate kingdom. During the Sassanian dynasty Media was joined to Persia, and has belonged to it ever since.

Med'ical College, a school organized under certain state or national regulations and devoted to the training of physicians and surgeons. The completion of the course carries with it the right to the degree of doctor of medicine (M. D.), and thus state regulation prevents the assuming of this degree by graduates of institutions whose work is below the required standard. The first medical school of which we have record was that of Salerno, Italy, established in the tenth century. Later medical training schools were introduced into all the large European universities and were probably the first professional schools so established. The first medical college in the United States was organized in 1765 under the name of the Medical College of Philadelphia and is still in existence as the medical department of the University of Pennsylvania. At present there are over 200 medical schools in the United States, and a number in Canada, many of which are departments of the great universities. Entrance requirements into such institutions are now rigid, and most of them demand graduation from an accredited college. The courses are from two to six years in extent. Postgraduate medical schools are also common.

A medical school for women, called the Women's Medical College, is located in Philadelphia.

Medici, *Med' e che,* a famous Italian family enriched through trade, and noted for its great number of statesmen, who were patrons of art and literature. By 1480 Florence was controlled by the Medici. Lorenzo the Magnificent is the most distinguished member, and under his rule Florence reached the height of its splendor. Catherine, wife of Henry II, was an unscrupulous woman who influenced public affairs during the reigns of her three sons. The popes Leo X, Leo XI and Clement VII, and Maria, the second wife of Henry IV of France, were also members of this family.

Medici, Lorenzo de' (1449-1492), a distinguished Florentine man of letters and ruler, called the Magnificent, born in Florence. He came of the family of the Medici who rose to great wealth and power in Florence primarily through their commercial successes. They secured control of the Florentine Republic and made it in reality a despotism. Lorenzo was a patron of art and literature, collecting many valuable specimens of the former and causing important manuscripts to be translated and preserved. He was himself a poet of distinction; but was not so careful a financier as the former heads of his family, spending his fortune lavishly and drawing unwarrantably from the public treasury.

Medicine, *Med' i sin,* the science and art of treating and preventing disease and alleviating the effects of injuries.

History. Of all the learned professions the practice of medicine is the most ancient and the most universally respected. Mankind has always been subject to disease and injuries, and from the earliest times the care and treatment of such affections have been relegated to certain classes of society supposed to be especially skilled in such matters. The code of Hammurabi, King of Babylon, 2200 B. C., consists of 282 laws, nine of which refer to the practice of medicine and surgery. It appears from these laws that the physician and surgeon occupied a distinct social position in the ancient Assyrian society, and that even in those remote periods the surgeon was considered worthy of compensation.

The earliest Grecian practice was more a combination of religion and philosophy than a system of remedial measures. The temples erected in honor of Æsculapius, the Greek god of the healing art, were always located in airy, sheltered, healthful places, and might be considered, to some extent at least, as prototypes of the modern sanatorium. The priests who had charge of these temples acquired a certain insight into medical science in time, and were able to help many of the applicants. Contagious diseases were not admitted. Remedial measures consisted largely of gymnastics, bathing, including running barefoot in the grass, dieting and rest cures. The veneration and substantial rewards accorded to the priests of Æsculapius gradually led other priests to practice medicine, and the art fell into disrepute. Hippocrates was a priest of Æsculapius, but emancipated himself and laid the foundation of scientific medicine in Greece about 400 B. C. It is uncertain whether or not Hippocrates himself wrote all or any of the great work which is credited to him, but it represents his teachings and is the only monument of ancient Grecian medicine. Galen (131-200) recognized the importance of the study of anatomy, and his work was authority until comparatively recent times.

Modern medicine may be considered as dating from about the 16th century. From this period on, the advance in scientific knowledge and in knowledge of medical sciences in particular was rapid and more accurately recorded. The invention and improvement of the microscope and the separation of chemistry from alchemy led to closer observation. Bedside and clinical instruction became the vogue, and the invention of printing from movable type contributed no less to the advancement of learning along the line of medical sciences than of other branches of knowledge. The anatomical studies of Vesalius prepared the way for Harvey's studies on the circulation of the

blood in animals, and his paper marks a division between scientific medicine and the experimental practice of earlier schools.

The 18th century is marked by the rise in social status of the medical practitioner, an important discovery being the observation of Jenner that milkmaids who contracted cowpox were thereafter immune to smallpox, leading to the application of vaccination as a preventive against the latter infection. The great advancement of medical science in the 19th century has been due to vastly increased facilities for laboratory investigation and research and to the fact that medicine draws upon all of the physical sciences for its diagnostic methods and remedial agents. Thus when physics produced the X ray, medicine appropriated and utilized the discovery as a diagnostic method of the greatest value. Chemists evolved the coal-tar products and enriched the *materia medica* with numerous organic compounds; and so all of the expanding physical sciences have contributed and are contributing to the growth of medical knowledge.

Among the noteworthy medical discoveries of the 19th century are the invention of the ophthalmoscope by Helmholtz and the stethoscope by Laënnec, both of which instruments instituted a new era in physical diagnosis. The discovery of the anæsthetic value of sulphuric ether in 1846, by Morton of Boston, greatly increased the field of surgery and the safety of operative measures. Pasteur's studies of fermentation and putrefaction prepared the way for the better understanding of the nature of the infectious diseases and their rational treatment, and inspired Lister to give to surgery the antiseptic treatment of wounds.

Following the discovery of plasmodium of malaria by Laveran in 1880 and of the bacillus of tuberculosis by Koch in 1882, most of the organisms concerned in the production of the infectious diseases have been isolated and studied, and the antitoxic treatment of several such disorders, by means of sera from immunized animals, has been placed upon a rational basis. Perhaps the best instance of this work is seen in the antitoxic treatment of diphtheria, and more recently in the prophylaxis of typhoid fever. Attention should also be called to the introduction of cocaine as a local anæsthetic by Koller in 1884, and its value in the surgery of the eye and other special sense organs.

Medical Practice. Practical medicine naturally divides itself into the general divisions of internal medicine, or the nonoperative treatment of disease, surgery, and obstetrics, or midwifery. They are based largely on the sciences of anatomy, physiology, normal and pathological histology, pharmacology, bacteriology and also chemistry and botany, all of which have an intimate relationship with medical practice and are therefore known as the medical sciences.

Schools of Medicine. Various schools of medicine have arisen from time to time, generally basing their apology for existence upon some special theory or treatment or medication. Some have served a useful purpose; as for instance, the sectarian medicine practiced by Hahnemann and his followers, known by them as homeopathy. Although homeopathy was founded upon a theory of the action of drugs not now accepted by therapeutists generally, nevertheless it was an effective protest against the enormous doses of medicines and the abuse of bloodletting in vogue during the 18th century.

Within more recent times various remedial systems have attained considerable popularity among the laity, particularly the mental healing cults and osteopathy.

Medicine Hat, a city of Canada in the Province of Alberta, on the Saskatchewan River and the Canadian Pacific Railway, 660 m. w. of Winnipeg. Small steamers can descend the Saskatchewan from the city to Lake Winnipeg, 800 m. distant. There are large deposits of coal and natural gas in this region. Among the important buildings are hotels and banks. The leading industrial establishments include large

grain elevators, brick and cement-block plants, and saw and flour mills. Population in 1911, 5608.

Medill', Joseph (1823-1899), an American journalist, born in New Brunswick, Canada. In 1831 his parents moved to the United States and settled at Massillon, Ohio. In 1846 Medill was admitted to the bar and began practicing at Canton. He was attracted to newspaper work, and in 1849 became connected with the Coshocton *Republican,* a paper advocating Free-Soil principles. A Whig paper, the Cleveland *Forest City,* and an independent journal, the *Free Democrat,* also claimed his attention. He purchased an interest in the Chicago *Tribune* in 1856, and in 1874 became principal proprietor and editor-in-chief, a position which he filled during the remainder of his life. He was elected mayor of Chicago in 1872.

Mediterranean, *Med" i ter a' ne an,* **Sea,** the great inland body of water almost enclosed by the continents of Europe, Asia and Africa, connecting with the Atlantic Ocean by the Strait of Gibraltar, and with the Black Sea by the Dardanelles, the Sea of Marmora and the Bosporus. It extends 2320 m. and has a maximum width of 1080 m. The greatest depth is 14,400 ft. It receives the Po, Rhône and Ebro rivers from Europe and the Nile from Africa. There is a constant in-flowing current from the Black Sea, and another from the Atlantic. In turn there is an undercurrent flowing in the contrary direction into both bodies of water. The Mediterranean is divided into the Ægean, Levantine, Ionian, Adriatic, Tyrrhenian and Balearic seas. It contains the islands of Sicily, Sardinia, Corsica, Crete and Cyprus and the Balearic Isles.

The European shore is broken by a great number of peninsulas, islands, bays and gulfs, and contains good harbors which have long been conducive to extensive commerce. The African shore, on the other hand, is smooth and unbroken. The sea has fish peculiar to its waters and contains over 400 species, not all of which are useful. There is a wealth of red coral, and the sardine, sponge and tunny fisheries are important. The tides are slight and the prevailing temperature of the surface water is generally higher than that of the Atlantic in the same latitudes.

Medul'la Ob"longa'ta. See BRAIN.

Medu'sa, in classic myths, the only mortal Gorgon, originally a beautiful maiden whose glory was her hair. When she boasted of it to Minerva, the goddess changed it into hissing snakes. See GORGONS.

Meerschaum, *Meer' shom,* a cream-colored clay whose composition consists chiefly of silicon and magnesium. It is used in making tobacco pipes. Its name in German signifies sea foam, which was given it because, when freshly dug up, if rubbed with water it forms considerable foam. The chief deposits are in Asia Minor, and the industry is 2000 years old. A variety of clay very similar to meerschaum is found in the South Atlantic States.

Megaphone, *Meg' a fone.* See SPEAKING TRUMPET.

Mehemet Ali, *Ma' he met Ah' le,* (1769-1849), an Egyptian pasha and viceroy. In 1805 he was elected pasha of Cairo and began to develop an army and navy modeled after those of the European powers. By his massacre of the Mamelukes in 1811 he gained undisputed control of Egypt. He was making headway against the Sultan when the powers of Europe forced him to sign a treaty continuing his subjection to the Turkish Government.

Meissonier, *Mes" so" nya',* **Jean Louis Ernest** (1815-1891), a French painter, born at Lyons and educated in Paris and Rome. His canvases contain historical subjects and portrayals of scenes from everyday life, and they are remarkable for fine finish and microscopic smoothness. About 60 of the 400 of them are in the United States. Other art branches in which Meissonier was successful were etching and engraving on wood. Among his noteworthy works are a portrait of Napoleon, *Cuirassiers* and *The Army of the Rhine.*

Mekong, *Ma" kong',* a river of Indo-China, rising in the mountains of central Tibet near the source of the Yangtse-kiang. Its course, generally southeastward, is crooked and interrupted by many falls, and only a small portion of it, near its mouth, is navigable. The total length is about 2800 miles.

Melanchthon, *Me lank' thun,* **Philipp** (1497-1560), the younger associate of Luther in the Protestant Reformation, born in Baden. When he entered the University of Heidelberg he changed his name, a common practice among scholars, from Schwarzerd to its Greek equivalent, Melanchthon. Graduating at the age of 14, he took his master's degree at Tübingen at 17, and immediately became a lecturer there. He was called to the chair of Greek at Wittenberg in 1518, where he met Luther. Drawn by Luther's urgency into the field of theology, he prepared in 1521 general outlines of theology, which constituted his first great contribution to the Reformation. His scholarship was of great assistance to Luther in the translation of the Bible, and he did much to crystallize Luther's views.

He wrote the final draft of the Augsburg Confession in 1530, and the next year published a vindication of the same in his *Apology,* the most learned of the Lutheran symbols. Gradually his views of the Lord's Supper became more like those of Calvin, and his relations with Luther were thereby strained, but never broken. Melanchthon was essentially a scholar and a peacemaker. His temper was gentle, historical, judicial and progressive. He was probably the foremost Protestant teacher of his time. Hallam calls him "far above all others the founder of general learning throughout Europe." His Latin and Greek grammars and his treatises on ethics became standard textbooks.

Mel'ba (Helen Porter Mitchell) (1859-), an English operatic soprano. She was born near Melbourne, Australia, the daughter of a British contractor of Scotch descent. At a very early age she gave evidence of superior talent and was educated in music by the best local teachers. But her father was opposed to a professional career, and it was not until after her marriage in 1882 to Capt. Charles Armstrong that she had opportunity for European study. She spent several years with Mme. Marchesi and in 1887 made her professional début in opera at Brussels, taking the name Mme. Melba. Her career in Europe and America has been remarkably successful. Her voice has been pronounced the most beautiful that has been heard by the present generation.

Melbourne, *Mel' burn,* the capital and largest city of the State of Victoria, Australia. It is situated on the Yarra River eight miles from its entrance into Fort Phillip Bay, and is entered by many large vessels; ocean-going boats come as far as Port Melbourne at the river's mouth. Melbourne is a busy city with great shipyards and foundries along the river, and is the greatest trade center of Australia. The House of Parliament and other government buildings, the public library, theaters and a modern opera house are among the most important public buildings. There are several educational institutions, among which are a university, botanical and zoological gardens and a museum of natural history. The principal exports are flour, butter, frozen meat, leather, wool, skins and hides and wheat. Population, 591,830. See AUSTRALIA, COMMONWEALTH OF.

Mel'ilot, a foreign member of the Pulse, or Pea, Family, which has become a familiar feature of roadsides and meadows. It grows to a height of about two feet, and because of its three leaflets, which resemble those of the clover, it is often called yellow sweet clover. The leaves of the melilot are less broad than those of the clover and are sharply-toothed. The tiny yellow flowers droop modestly on their branching vertical stems and are miniatures of the butterfly-like pea blossoms. White melilot is equally common; it is taller and has white blossoms. Both species bloom from June to August and then bear small pods of seeds. Waste ground which

bears melilot is said to be equally fitted for raising alfalfa.

Mel'len, Charles Sanger (1851-), an American capitalist and railway manager, born in Lowell, Mass. In 1869 he began railway service as clerk in the cashier's office of the Northern New Hampshire Railroad, and in 20 years he had risen to be general traffic manager of the Union Pacific system. In 1892 he became general manager of the New York & New England Railway, later president of the Northern Pacific, then president of the New York, New Haven & Hartford Railroad Company, and in 1910 president of the Boston & Maine Railway Company.

Mel'on. See GOURD; MUSKMELON.

Mel'rose, Mass., a city of Middlesex Co., 7 m. n. of Boston, on the Boston & Maine Railroad. It is a residential suburb of Boston. The most important manufactures include boots, shoes and rubbers. Melrose was chartered as a city in 1900 and includes the villages of Wyoming, Fells and Melrose Highlands. Among the interesting features are Middlesex Fells, a state reservation of 1800 acres, and a large natural reservoir named Spot Pond. The first settlement was made in 1633. Melrose formed a part of Charlestown until 1649, and of Malden from that time until it was incorporated in 1650. Population in 1920, U. S. census, 18,204.

Memling, *Mem' ling,* **Hans** (1430-1494), a Flemish painter, whose name is also written Memlinc. He early developed a style remarkable for delicacy of finish, elaboration of landscape and costume and minute handling of details, and a technique far in advance of his time. His greatest works were the *Shrine of St. Ursula,* at Bruges; *Madonna and Saints,* now in the Louvre; and *Virgin and Child,* at Chatsworth, England.

Memminger, *Mem' in jer,* **Charles Gustavus** (1803-1888), an American statesman, born in Württemberg, Germany. He was taken to South Carolina in infancy and adopted by Thomas Bennett. He graduated at South Carolina College in 1820, was admitted to the bar and began a successful practice in Charleston. For nearly 20 years he served in the State Legislature, where he opposed the doctrines of John C. Calhoun. He joined in the secession movement, and was secretary of the treasury for the Confederacy until 1864, when he retired to private life.

Mem'non, a mythical personage frequently mentioned by Greek writers. He was King of the Ethiopians and fought the Greeks in the Trojan War. He was slain by Achilles, after having himself killed Antilochus. Subsequently the name Memnon was given to a statue in Thebes, Egypt, which, because of its size, was also called the Colossus. A vocal stone, it was thought to give utterance to a sound at each sunrise.

Memo'rial Day, the day set apart each year, first by custom and later by statute, for the purpose of honoring the memory of the soldiers who fought in the Civil War. The custom of Decoration Day, as it is otherwise called, originated with the Southern States in strewing flowers over the soldiers' graves, and this idea was adopted by a few States in the North. In May, 1868, Gen. John A. Logan, then commander-in-chief of the Grand Army of the Republic, issued an order appointing May 30 of that year for Grand Army services in so decorating graves. The day possibly was chosen because it was the date of discharge of the last Union volunteer of the war. The states which observe the day have adopted it singly, there being no national law on the subject.

Mem'ory, the reproduction by the mind of previous thoughts or impressions, and the knowledge that there are impressions that have been received before. The important part that memory plays in one's fund of knowledge renders it important that this power of the mind should be as well trained as possible to reproduce accurately and well; yet failures of memory are of so frequent occurrence that it is probable that too little heed is given to the laws governing it. A person is not, as some suppose, born with a poor or a good mem-

ory, but there are certain times in the life when the memory may be more easily trained than at others, and neglect at this time renders more labor necessary in order to accomplish the same results later. The memory of the child is far inferior to that of the adult, although the memory does not increase in any regular way. It generally shows greatest improvement during the 10th and 11th years and least during the 14th year. It varies, too, in regard to the subject to be remembered, numbers being least easily reproduced, words somewhat more easily and objects or actions most readily remembered.

Laws of Memory. The memory acts according to four laws, known as the laws of association. These were established by Aristotle and are association by contiguity, by succession, by similarity and by contrast. See Ideas, Association of.

Factors That Aid the Memory. There has always been an impression that if a child gives close attention to an impression there should be no difficulty in reproducing it, or, to state it in the converse, if the child cannot reproduce an impression he has given no attention to it. This, however, has long been proved to be a faulty assumption. Give a child a list of nonsense syllables, then after a moment's rest, ask him to repeat them. Again give him another list and immediately afterward turn his mind to a picture or a toy for the same interval as before and then ask him to repeat them. The two results will show that the time spent in rest in the first instance was time well spent. Again, if several books are read in rapid succession none is apt to impress the mind vividly, while if each is digested before the next is read, the result is more satisfactory. Physicians say that if a person is injured by a blow upon the head, the memory, returning later, recalls events that occurred some time before the accident rather than those just prior to it. The process of letting a thought "sink into the mind" is an important part of forming an accurate memory of it.

Other factors which aid in memorizing are more commonly understood: (1) A repetition of the thing to be remembered helps to fix it in the mind. (2) Repetitions after intervals of not too long extent are of greater value than those made immediately. (3) The amount to be remembered is also a matter for attention; it is rarely understood that in memorizing a selection, whether poetry or prose, better and quicker results are secured by reading the entire selection each time rather than memorizing a small portion at a time. (4) Poems are generally more easily remembered than prose, as are also any impressions which can be made to assume a temporary rhythm. (5) Much depends upon the clearness of the mind at the time the impression is received, as a wearied brain fails to grasp what a refreshed one receives readily. (6) The vividness of the impression aids; as a loud, sudden sound, a bright color, an unusual motion are longest and most easily remembered.

Types of Memory. Different minds receive the same impression with differing degrees of vividness, and the explanation of this is to be found in the type of mind upon which the impression acts. Some minds receive visual impressions best, some auditory and some motor. In a class of 30 pupils, probably one-third, the visualizers, remember well the things that are seen written out; these pupils cannot learn readily a poem read to them though read again and again; another third depend upon the hearing and cannot remember the poem so well from reading it themselves as from hearing it read. The last third, depending upon motor impressions, best memorize a selection by writing it out or acting it out. A teacher should constantly remind herself that she has each of these types of mind before her, each requiring its own method of instruction, and that inability to remember is not always a fault of inattention.

Differences between boys and girls in the matter of memory are also worthy of note; girls remember most easily things which they have seen, while boys

remember readily names of abstract things. The memory of a girl is generally better than that of a boy between the 11th and 14th years, while later that of the boy is superior.

Memphis, *Mem' fis,* the Noph and Moph of the Old Testament, was situated about 10 m. s. of Cairo. It was the oldest capital of Egypt, and during the periods of ancient Egyptian history there was a shifting of power between Memphis and Thebes. When Alexandria was at its height, Memphis held second place and was still important, though declining, at the time of the Moslem conquest. Although much of its building material has been used to build up other cities, there still remain many relics of interest. Among these are the great statue of Rameses II and the Gizeh group of Pyramids. As the city was a center of learning for ten centuries, there are also many ruins of temples and palaces.

Memphis, Tenn., the metropolis of the state and the county seat of Shelby Co., in the southwestern part of the state, beautifully located on Chickasaw Bluff overlooking the Mississippi River just below the entrance of Wolf River. It is on the Illinois Central, the Louisville & Nashville, the Nashville, Chattanooga & St. Louis, the Yazoo & Mississippi Valley, the Chicago, Rock Island & Pacific, the St. Louis & San Francisco, the St. Louis South-Western, the St. Louis, Iron Mountain & Southern and other railroads, and is connected by boat with all Mississippi ports. It is 396 m. n. of New Orleans and about 530 m. s. of Chicago. It lies 40 ft. above the greatest flood height of the river and 287 ft. above sea level.

Streets, Boulevards and Parks. Memphis has great natural beauty, and its winding drives about the hills and along the river have been laid among the most charming of these scenes. Its park system is remarkable for its beauty and for its extent. Overton Park, on the outskirts of the city, contains a natural hardwood forest, broad, open spaces, well-kept drives and woodland walks about an artificial lake. Pergolas, gardens and a marble memorial fountain add to the beauty of the park, and a large well-stocked zoological garden is both interesting and instructive. Riverside Park lies along the bluff and is remarkable for its views of the river; it is accessible from the river, having a boat landing below the bluff and a long flight of steps reaching the summit. Among the other parks are Confederate Park with the United States Custom-House, Court and Auction squares, Forrest Park, with its lily pond and its fine equestrian statue of General Forrest; Astor Park, Gaston Park, Bickford Park, The Bluff, De Soto Park and a parkway or boulevard over 11 m. in length, including picturesque sunken gardens. The city streets, with their hospitable residences and fine business blocks, are everywhere cared for with the same attention given the parks.

Public Buildings. Memphis has many public buildings conspicuous for their grace of architecture. Chief among these is the classic courthouse, which is one of the most beautiful representatives of American architecture, with its dignified columns and its sculptured figures. Other prominent buildings are the government buildings, the Goodwyn Institute and Public Library, the Auditorium, a Masonic Temple, an Odd Fellows' Building, the Cossett Free Library, the buildings of the many city clubs, the Cotton Exchange and several public hospitals.

Educational Institutions. The city has recently completed a large, modern high-school building, which is an excellent criterion of the public school system. Memphis also has the Hannibal Medical College, the Memphis Hospital Medical College, the College of Physicians and Surgeons, the College of Christian Brothers, the Le Moyne Normal Institute and St. Agnes Academy.

Industries. Memphis is a great distributing center, with its many railroad lines and its great river traffic. Its harbor has been improved until the largest men-of-war could ascend to its docks,

and boat building has long been carried on. The city is the most important cotton interior market and one of the largest hardwood centers of the world. The grocery jobbing trade amounts to $10,000,000 yearly, live stock, $65,000,000. Meat packing promises to be a profitable industry. Among the many factories may be mentioned those producing furniture, veneers, barrels, bags, stock feeds, oars, automobile wheels, cotton-seed products, sash and doors, boxes, coffins, carriages, wagons and cars. The Virginia Bridge & Iron Company, the National Biscuit Company, the Memphis Flooring Company and the American Steel & Wire Company all have large plants in or near the city. The city has cheap and excellent water power and over 80 artesian wells.

History. De Soto visited the site of Memphis in 1541 and found a village of Chickasaw Indians. In the 17th century the French built a fort there, which passed into the hands of the United States in 1797. Later the Chickasaws gave up claim to their territory and Memphis was laid out in 1819. It was named after its prototype in location upon the Nile. It was incorporated as a village in 1827 and became a city in 1849. It was the scene of many naval operations during the Civil War. The city has a commission form of government. Population in 1920, 162,351.

Memphremagog, *Mem" fre ma' gog,* **Lake,** situated in the southern part of Quebec, Canada, and in the northern part of Vermont, U. S. A. It is a long, narrow lake, extending about 35 m., and contains numerous islands. Magog River is the outlet. The lake is noted for its picturesque scenery and is a favorite summer resort, many villas and hotels lining its shores.

Menan'der (342-about 291 B. C.), a Greek dramatic poet, one of the foremost of the Attic New Comedy. He was born at Athens. Only fragments of his plays remain, and our chief knowledge of these comedies is gained from the adaptations made by Plautus and Terence. Menander, according to ancient critics, was distinguished for wit, perfection of language and skillful plots. See Drama.

Men'del's Law, a principle of heredity discovered and formulated in 1865, by Mendel, an Austrian monk, but not considered important until reestablished by De Vries, 1900. By means of cross-fertilization of certain varieties of peas, Mendel observed that the offspring of parent plants having corresponding but opposing characteristics retain the characteristic of one parent to the exclusion of that of the other. The retained characteristic is said to be dominant; the other recessive. Of the next generation 25 per cent have the dominant and 25 per cent the recessive, while the remaining 50 per cent have a mixture which consists mainly of the dominant character. This principle, which De Vries established by means of work with primroses, has been found to hold true for animals as well as for plants. The law is important since it establishes principles of heredity which are of use in breeding animals or plants where certain characteristics are especially desired.

Mendelssohn-Bartholdy, *Men' del sone-Bar" tol" de',* **Felix** (1809-1847), the celebrated German musical composer, was born at Hamburg, grandson of the philosopher, Moses Mendelssohn. Mendelssohn's father was a successful banker and gave his son a careful academic and musical education. When the boy was ten years of age he appeared in public concert in Berlin, and shortly afterward began to compose music. At the age of 17 Mendelssohn wrote the overture to *A Midsummer Night's Dream,* a work which showed great originality of conception and a thorough mastery of constructive details, and in which the fanciful and grotesque were delicately mingled. This work gave to the composer a place among the distinguished musicians of his day. His precocity expressed itself not only through his music; at an early age he became a polished man of the world, holding his own among the best intellects of his time, yet maintaining, as throughout the re-

mainder of his life, the simple purity of a child.

At the age of 20 he visited Paris, Rome, Munich, Vienna and London. His brilliant orchestral conducting and the charm of his compositions brought wide celebrity, and in the years that followed he was the recipient of many honors from musical societies and from royalty. Mendelssohn's compositions embrace sonatas, symphonies, oratorios, besides numerous smaller forms for voice, piano and orchestra. Among his well-known works are the *Songs Without Words;* the overture to *The Isles of Fingal;* the oratorios, *Elijah* and *St. Paul;* the cantata to Goethe's *First Walpurgis Night;* and *Athalie.*

Men"ela'us, in Greek mythology, King of Sparta, brother of Agamemnon and husband of Helen, to recapture whom he led a fleet of 60 ships to the Trojan War. See HELEN; TROJAN WAR.

Menendez de Aviles, *Ma nen' dathe da Ah" ve lase',* **Pedro** (1519-1574), a Spanish admiral and colonizer of Florida. In 1565 he was appointed, by Philip II, governor of Florida. He there founded St. Augustine and almost exterminated the Huguenots at Ft. Caroline. His attempt of 1570 to establish a Jesuit mission near Chesapeake Bay failed. Two years later, while preparing to colonize the Potomac and Chesapeake region, he was appointed commander of a fleet against the Low Countries, but died while arranging for the expedition.

Menha'den, an important fish of the Herring Family. As a food fish it is not highly valued and was once considered practically worthless because of its coarse, oily flesh; the young were, to a small extent, packed in oil and sold as sardines. Recently, however, the oil, which prevented the use of the fish as a food, has been found to have great value in dressing leather and adulterating other oils, and large factories for its extraction are in operation in the United States. For these factories, the menhaden are generally taken in the fall, as their yield of oil is then six or seven times as great as in the spring. The refuse of the fish after the oil has been extracted is packed and sent to all parts of the country as fertilizer. On account of the abundance of the fish, the great use of the oil and value of the refuse from the oil presses, the menhaden constitutes one of the most valuable American commercial fish, ranking with the cod, herring and salmon.

The menhaden has a long, compressed body, narrow fins and large scales. The head is relatively short and the lateral line indistinct. These fish swim in large schools, close to the surface of the water; their range is from Nova Scotia to Florida. The menhaden has at least 30 popular names, the most common of which are mossbunker, hard-head, bony fish and shippang.

Men'nonites, a Christian denomination originating in Switzerland in the 16th century. The name comes from that of Menno Simons, leader of the sect in Holland. The first congregation of Mennonites was founded in Zürich in 1525 by Conrad Grebel and his associates; the movement spread to southern Germany and Austria and later to Moravia and Holland. Among Mennonites emphasis is laid on uprightness of conduct more than on doctrine, divorce is condemned and the bearing of arms and the taking of oaths forbidden. The Church has a congregational form of government. Mennonites first settled in America in 1683, in Pennsylvania. In the United States they are divided into 13 branches, reporting, in 1911, a total membership of 55,007.

Menom'inee, Mich., a city and the county seat of Menominee Co., on Green Bay at the mouth of the Menominee River, 51 m. n.e. of Green Bay, Wis., and opposite Marinette, Wis., with which city it is connected by bridges. The Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Wisconsin & Michigan and other railroads enter the city. Menominee is one of the most important lumber-shipping ports on the Great Lakes and has numerous saw and planing mills. The chief manufactures are lumber, paper, machinery, electrical

appliances, telephones, wire, steel, steam boilers, boxes, beet sugar and shoes. There is a good harbor and the dock facilities are of the best. In Menominee are the county buildings, a public library, a fine high-school building and St. Joseph's Hospital. The first settlement on the site of Menominee was made in 1799 by Louis Chappieu, a French fur trader, but the town was not incorporated until 1833. Menominee was named after the Menominee Indians, a tribe of the Algonquins. Population in 1920, 8,907.

Menom'onie, Wis., a city and the county seat of Dunn Co., 22 m. w. of Eau Claire and 69 m. e. of St. Paul, Minn., on the Red Cedar River and on the Chicago, Milwaukee & St. Paul, the Chicago, St. Paul, Minneapolis & Omaha and other railroads. The industrial features of the town include grain elevators, foundries, machine shops, brickyards, wagon and carriage factories and flour mills. Menomonie has a large trade in lumber, live stock and dairy products. The city is especially noted for its educational institutions. Chief among these are the Dunn County School of Agriculture, the Mabel Tainter Memorial Library, the Dunn County Normal Training School, the Stout Manual Training School and a fine memorial library. The first free traveling library in the state was established here. Settled in 1846, the place was chartered as a city in 1882. Population in 1920, 5,104.

Mephistopheles, *Mef" is tof' el eez.* See FAUST, JOHANN.

Merca'tor's Projection. See MAP.

Merchant Marine, a collective term for the commercial fleets or the shipping of the world or of any nation. Between the War of 1812 and the Civil War, the merchant marine of the United States developed so rapidly that in 1859 nearly 70 per cent of the foreign commerce of the country was carried in American vessels. During the Civil War, however, American shipping suffered such heavy losses that the United States merchant marine has not since then been commensurate with the power and wealth of the nation. The following table gives the tonnage for 1920 of the shipping of the most important nations:

British Empire	18,607,875
United States	13,091,773
Germany	3,503,380
Norway	1,827,829
France	2,233,631
Italy	1,370,097
Japan	2,325,266
Holland	1,591,911
Sweden	992,611
Russia	541,005
Austria	714,617
Spain	750,711
Denmark	702,436
Greece	323,796

Mercury, *Mur' ku ry,* (in Greek, Hermes), son of Jupiter and Maia, was messenger of the gods, and presided over eloquence, commerce, traveling, pasturing, as well as thieving and gymnastics. When a few hours old, he invented the lyre by stretching nine cords (in honor of the nine Muses) across a tortoise shell. The same day he stole the oxen which Apollo was tending on the banks of the Amphrysus. Later he stole the trident of Neptune, the girdle of Venus, the sword of Mars, Jupiter's scepter and several of Vulcan's tools. He was cupbearer to the gods previous to Hebe, conducted the dead to the lower world and presided over highways and crossroads, where statuettes of him were placed.

Mercury gave Apollo his lyre, in return for which he received the caduceus, a "golden three-leaved rod," snake entwined, the bestower of riches. From Jupiter he had received winged cap and sandals, by means of which he could instantly be transported wherever he wished, in any form whatsoever, or invisible. Roman merchants celebrated each 13th of May in honor of Mercury.

Mercury, the planet of the solar system located nearest the sun. Its mean distance from the sun is about 36,000,000 m. Its period of revolution around the sun, or year, is 88 of our days. It is about one-fourth the size of the earth, being 3030 m. in diameter, and it is only about two-thirds as dense as the earth. The period of its revolution on its axis, or its day, has not been positively settled,

but appears to be the same as its period of revolution around the sun, 88 days. If this be so, then Mercury always presents the same portion of its surface to the sun, that part being always day and the opposite side being always night. Mercury is morning star three times and evening star three times yearly. On account of its nearness to the sun it cannot be seen later than two hours after sunset, nor earlier than two hours before sunrise, and even then it is not easily seen by the naked eye.

Mercury, or **Quicksilver,** the only metal which is liquid at ordinary temperatures. It is sometimes found free in the crevices of rocks, but is more ordinarily found in combination with sulphur in a mineral called cinnabar. Mercury is a lustrous, white substance whose vapors and compounds are all poisonous. When it is solid it is extremely malleable. Compounds of mercury and other metals are called amalgams and have many commercial uses. Tin amalgam is used for backs of mirrors, and an amalgam of copper, cadmium, gold and tin is used by dentists in filling teeth. Mercury is used in gold and silver mining for forming amalgams with the silver and gold, from which it is later separated. Pure mercury is used in making barometers and thermometers. Mercury has been known as an element since 300 B. C.

Mercy, Sisters of, a name often indiscriminately applied to religious organizations among women, having for their purpose the nursing of the sick and the assistance of the poor. The name properly belongs to an order in the Roman Catholic Church founded in Dublin in 1827. The order includes two classes, choir sisters and lay sisters. The choir sisters devote their time to visiting the sick and other charitable work, and the lay sisters engage in domestic occupations. There are many branches of the order throughout Europe and America. Each community is independent of the others in the order, but is subject to the bishops. Their vows bind them to poverty, celibacy, obedience and charity.

Mer de Glace, *Mer" de Glahs'*, (Sea of Ice), an Alpine glacier situated on the northern slope of Mont Blanc. It is 16 m. long and about half as wide, and is formed by the confluence of three glaciers from above. It terminates in the Glacier des Bois, from which arises the Arveyron River in the Valley of Chamouni. The glacier moves downward at the rate of about two feet a day in summer and winter.

Mer'edith, George (1828-1909), an English novelist and poet, born in Portsmouth. He studied in Germany and was greatly influenced by the German spirit and literature. On his return to England he showed a marked distaste for law and turned to journalism. He lived in Italy during the Austro-Italian war of 1866, acting as special correspondent for the *Morning Post.* For a short time he was acting editor of the *Fortnightly Review.* His novels and poetry were long unrecognized, except by a few of his intimate friends, among whom were Tennyson, Rossetti, George Eliot and Swinburne. Before his death he was chosen to succeed Tennyson as president of the Authors' Society, and was included by the King in the Order of Merit.

Much of his poetry is obscure, difficult and intellectual, but poems like *Love in the Valley, The Thrush in February, The South-Wester, The Woods of Westermain, A Faith on Trial,* are touched with both music and magic. To Meredith verse was the highest form of expression. His novels are analytical studies of human nature, and rank with the best fiction of his time. The style is peculiar, yet brilliant; his themes are big, bearing on the great emotions of the human heart; his characters are not popular heroes, but strong and significant personalities. He combined successfully humor, irony, pathos, rich imagination and romance. As a moralist Meredith frequently worked through comedy, preferring to ridicule evil-doers rather than to censure them. Among his works are *The Shaving of Shagpat, The Ordeal of Richard Feverel, Evan*

Harrington, The Egoist, Diana of the Crossways, Celt and Saxon (unfinished and published after his death), *The Sentimentalists, Modern Love, and Poems of the English Roadside, with Poems and Ballads, Poems and Lyrics of the Joy of Earth* and *Ballads and Poems.*

Meredith, Owen. See LYT'TON, EDWARD ROBERT BULWER.

Meredith, Sir William Ralph (1840-), a Canadian statesman, born in Ontario and educated at Toronto University. A leader of the provincial bar, he was city solicitor of London, Ontario, later removing to Toronto, where he was corporation counsel and head of the city's legal department. He entered the Legislature in 1872. While in the House he closely identified himself with the workingman's interest, advocated manhood suffrage, affirmed the necessity of a strong central government, denounced a political head for educational departments and fought against undue clerical influence in educational affairs. In October, 1894, he became chief justice of the common pleas division of the High Court of Justice of Ontario. Queen Victoria knighted him in 1896.

Mer'iden, Conn., a city of New Haven Co., 18 m. s.w. of Hartford and 18 m. n.e. of New Haven, on branches of the New York, New Haven & Hartford and other railroads. Meriden is situated in an agricultural region and is one of the most prosperous industrial centers in New England. Among the attractive places is Hubbard Park, a beautiful natural reservation of 1500 acres, within the limits of which are the Hanging Hills, three elevations which rise about 1007 ft. above the level of the sea. Other parks include the City, Brookside, Hemlock Grove and Hanover. Lake Merimere, the largest of the four reservoirs, is situated near the boundary of the city. Among the institutions are the Connecticut Reform School for boys, Curtis Home for orphan children and aged women, Meriden Hospital, Curtis Memorial Library, a state armory and a tuberculosis sanitarium built by the citizens of Meriden and turned over to the state as a state institution.

Meriden is often called the "Silver City" on account of its extensive manufactories of sterling and silver-plated ware. Other manufactured products include cutlery, britannia ware, machinery, screws, vises, steel pens, cut glass, bronze goods, malleable-iron goods, brass castings, pianos and pianolas, photogelatin, gas and kerosene fixtures, clocks, art glass, tinware, firearms, optical instruments, leather goods, brass castings, curtain fixtures, electrical appliances, wooden and agate ware, oil heaters, rotary engines, art novelties and lamp trimmings. The shipments also include fruit, vegetables and tobacco.

Meriden was originally a part of the Township of Wallingford, a small settlement being made here in 1670 by settlers from the New Haven Colony who purchased a tract of land from the Pequod Indians. The northern portion of this tract was known as Merideen. It was incorporated as a separate parish in 1728 and became a separate township in 1806. A city charter was granted in 1867. Population in 1920, 29,842.

Merid'ian, one-half of a great circle of the earth or of the celestial sphere, extending from pole to pole. Meridians are imaginary, and it is customary to say that the sun at the zenith of any place is on the meridian of that place. The meridian of any place produced until it intersects the celestial sphere is the corresponding celestial meridian. In 1884 the United States adopted the meridian passing through Greenwich near London, England, as the standard meridian from which distances are reckoned east and west 180 degrees. This gives the longitude of any place, ship or heavenly body. See ASTRONOMY; CELESTIAL SPHERE; LONGITUDE; RIGHT ASCENSION.

Meridian, Miss., the largest city in the state and county seat of Lauderdale Co., about 90 m. e. of Jackson and 100 m. from the Gulf of Mexico, on the Alabama Great Southern, the Southern, the Mobile & Ohio, the Alabama & Vicksburg and the New Orleans & Northeast-

ern and other railroads. Meridian is the great industrial and commercial center of the state. It occupies the center of a cotton-growing section and has an important cotton trade, and contains cotton and cottonseed-oil mills, railroad machine shops, lumber mills and manufactories of confectionery, hosiery, yarn, clothing, harness, mattresses, brooms, furniture, wagons, foundry castings, stoves, soap, fertilizers and other products. The city has an adequate modern street-railway service and many miles of well-paved streets. The National Cemetery and Highland parks are two of the most beautiful parks in the state.

Among the leading institutions are the Meridian Woman's College (Methodist), Meridian Male College, Lincoln School for negroes (Congregational), and Meridian Academy, a high school, Conservatory of Music and public and parochial schools. Other noteworthy institutions are the East Mississippi Insane Hospital, the State Masonic Widows and Orphans' Home and the Matty Hersy Hospital. There are many fine churches and handsome residences.

Meridian was laid out in 1854 and six years later received a city charter. In 1864 the city, which was a center and depot for Confederate supplies, was destroyed by Sherman's army. In 1906 a large part of the business section of the city was destroyed by a tornado, but it was rapidly rebuilt. The annual Mississippi-Alabama Fair, established in 1910, is one of the greatest of the South. Population in 1920, 23,436.

Mer'lin, a name given to the small hawk of Europe, which is related to the pigeon hawk of the United States. The American representative is from 10 to 13 inches in length. The upper parts are bluish-gray, streaked with black on the feather shafts. The under parts are whitish, heavily striped with dark gray; the wings are barred or spotted and the tail is crossed by five light bands. The female is brownish above and is larger than the male. The nest is made on cliffs, in which case the material used is scanty; or in trees, where a rather bulky nest is made of grass and sticks and lined with feathers and other soft material. Four or five reddish-brown eggs are laid. The pigeon hawk is widely distributed, its range extending from the Arctic Ocean to northern South America.

Mer'rick, Leonard (1864-), an English novelist. He was educated at Brighton College and in private schools. Merrick is one of the leading modern British novelists. His stories deal almost entirely with actors and writers, and are characterized by excellence of form, facility of narrative and a graceful and charming style. His idea of the novelist's mission—to be true to life in details as well as in essence—identifies him distinctly with the realistic school of fiction. His novels include *The Man Who Was Good, Cynthia, a Daughter of the Philistines, The House of Lynch, The Actor-Manager* and *Conrad in Quest of His Youth.* He has also written the plays *When the Lamps are Lighted, The Elixir of Youth* and *My Innocent Boy.*

Mer'rill, Wis., a city and the county seat of Lincoln Co., about 145 m. n. of Madison and 185 m. n.w. of Milwaukee, on the Wisconsin River and on the Chicago, Milwaukee & St. Paul and other railroads. The town is an important hardwood lumber market, and the manufacture of sawed lumber, sash, doors and blinds, lath, shingles and other lumber products constitute important industries. Other manufactures are paper and paper pulp. In the vicinity are brickyards and granite quarries. The town is built upon both sides of the river and is about 1270 ft. above sea level. A short distance from the city are Grandfather Falls, from which water power is derived, and the Dells of the Prairie River, both of which constitute scenic attractions. The principal buildings are Lincoln County Courthouse, a fine high school, the T. B. Scott free library, an opera house and the Ravn Hospital, a private institution. Settled in 1875, Merrill was incorporated as a village in 1880 and chartered as a city in 1883. Population in 1920, 8,068.

Merrimac, *Mer' i mak,* **River,** a stream of New Hampshire and Massachusetts, formed by the union of the Winnipiseogee and Pemigewasset rivers, the latter of which rises in the White Mountains. The Merrimac flows southward into Massachusetts, then turns eastward, emptying into the Atlantic Ocean near Newburyport. Including the Pemigewasset, it has a length of 183 m. Several manufacturing cities utilize its water power, among them Lowell, Lawrence, Haverhill, Manchester, Nashua and Concord.

Merrimac, The. See HAMPTON ROADS, BATTLE OF.

Mer'ry del Val, *Vahl,* **Raphael** (1865-), a Roman Catholic prelate, born in London, of Spanish parents. After taking orders in 1892, he became papal chamberlain and, later, prelate of the papal household. Subsequently he was consecrated Bishop of Nicæa *in partibus,* served as secretary of the conclave which elected Pius X pope, and in October, 1903, became papal secretary of state. In November of that year he was created a cardinal.

Mersey, *Mur' zy,* a river of England, rising in the northern part of Derbyshire and forming the navigable Liverpool Channel as it flows into the Irish Sea. It is 70 m. long, and by means of a ship canal following its course, vessels can navigate as far as Manchester.

Mesa, *Ma' sah,* a small isolated plateau. The typical mesa is a small tableland with precipitous sides and capped by a layer of hard, resistant rock, either limestone or lava, such as may be seen in the region traversed by the Colorado River. Such a formation represents the remnant of what in some former geological epoch was a vast and more elevated plain, but which has been worn down by erosion, except in places where the hard rock layers protected the underlying soft soil, giving rise to a tablelike elevation. The most typical of these formations are the famous Mesa Encantada in New Mexico and the Mesa Verde in Colorado.

Mes'merism. See HYP'NOTISM.

Mes"opota'mia, the term means "between the rivers" and from earliest times has been applied to the section in western Asia between the Tigris and the Euphrates rivers. The lower portion of this valley, for a distance of 400 miles from the sea—one vast alluvial plain—was ancient Chaldea, or Babylonia, of Bible times. Under the blight of Turkish misrule it was a pestilential expanse or a sundried waste, yet, anciently it was one of the most fertile sections in the world. There was located the Plains of Shinar, there were the cities of "Babel and Erech, and Acad, and Calneh" of Genesis. The northern section above the alluvial plain, proper, extending from Chaldea to above Mosul on the Tigris, was Assyria. Nineveh, the capital, was "that great city" to which the Bible refers as the scene of the labors of the Prophet Jonah.

As one of the results of the World War, lower Mesopotamia passes under the mandate rule of Great Britain and may become once again a scene of smiling peace and plenty.

Mesquite, *Mes keet',* a tree or shrub of the Pulse, or Pea, Family, found in southern and western United States and in South America. It varies in size and development according to the richness of the soil and the amount of moisture obtainable. In many places in the West the mesquite is the only foliage plant for miles. The tree has a long, straight root and a tall or shrublike stem; its branches are numerous and beset with sharp thorns. The leaves are composed of pairs of long, slender leaflets. The flowers appear in rapidly succeeding crops from May until July and are followed by long, thin pods divided into as many cells as there are seeds; these cell divisions are noticeable on the outside of the pod and give it the appearance of a close-set string of beads. The pods are rich in nourishment and are food for stock. The wood is heavy, close-grained and rich brown in color; since it is practically indestructible in contact with the ground, it is used for making fence posts and for underground construction.

Messi'ah (anointed), a Jewish term corresponding in meaning to the Greek term *Christ*. The Jews were accustomed to anoint their kings, who were often called "The Lord's Anointed." In Jewish prophecy the term, or title, came to be used specifically for a promised king who was expected to redeem his nation from foreign rulers. Some of the more enlightened and godly of the Jews believed that the Messiah was to be a spiritual ruler, but these were greatly in the minority. See JESUS CHRIST.

Messina, *Me se' na,* a seaport of Sicily and the capital of the Province of Messina, situated on the Strait of Messina, 59 m. by rail n.e. of Catania. The harbor is sickle-shaped and one of the best in the Mediterranean. Though the site affords a fine view of Mt. Etna and the sea, the city itself possesses no features of great distinction, due to frequent destructions by earthquakes. It is noted industrially for the Mamertine wines of the district, for the fishing and for the manufactured products, including hardware, linen, silk and muslin. Steamship communication is maintained between the city and Marseilles and Naples. The university was founded in 1538; there are also a technical institute and a municipal harbor. Messina is thought to have been founded by pirates from Cumæ in the eighth century. It was in the hands of various nations during the Middle Ages and the centuries following, and in 1861 it became a part of United Italy. The plague of 1743 was very destructive, and the earthquake of 1783 worked further ravages with the population. Population of the commune, about 150,000.

Messina, Strait of, a channel connecting the Ionian and the Tyrrhenian seas, and separating Sicily from Italy. It is 24 m. long, varies from 2 to 12 m. in breadth and has a maximum depth of over 4000 ft. The regular tidal currents are strong and navigation is difficult. See CHARYBDIS.

Met'allur"gy, that branch of applied science which deals with the extraction of metals from their ores. Some metals are found free; as, for instance, gold and platinum, which usually occur as such, while silver, copper and bismuth are often obtained free. In those cases they require but little treatment. Metals such as iron, tin, lead, zinc, nickel, antimony, mercury and aluminum occur almost invariably in combination with other substances, as oxides, sulphides, sulphates, carbonates, silicates, chlorides, etc.

ORE DRESSING. When ores are mined they are usually found to contain a large quantity of material that is worthless. Most of this is disposed of by crushing the ore and washing it over screens in order to separate or concentrate the desired materials. This process is known as concentration and is performed by machinery. The concentrate is then dried and smelted to procure the metal. Metallurgy has to do not only with the extraction of metals from their ores, but also with the working of them into final products by casting, rolling or pressing. In these final operations the metals undergo changes in the structure of their molecular particles, which, with the chemical alterations assumed in the preliminary working of them, renders their appearance quite different from that in which they were found in the ore.

PROCESSES. Various metals require different treatments, and these may be divided into the following processes: (1) smelting, in which heat, aided by chemical reactions, is employed to extract the metal from the ores; (2) amalgamation, in which an amalgam is formed with the metal and mercury, the mercury afterwards being separated by distillation; (3) chemical extraction, by which the metal is dissolved and afterwards precipitated in solid form by chemicals or by electrochemical deposition; (4) electrolytic, in which the metal is extracted from the ore or refined by an electric treatment, called electrolysis. Sometimes a combination of two or more of these processes is used.

Smelting in blast and reverberatory furnaces is the process most generally used, and is employed in extracting iron, copper and lead from their ores. Amal-

gamation is used chiefly in gold and silver ores. Zinc is heated in fire-clay retorts, and the vapors are condensed. Aluminum is produced by passing a powerful electric current through melted cryolite, in which aluminum oxide is dissolved. Ores containing a small quantity of gold, known as low-grade ore, are generally treated by the cyanide process; after the ore is crushed to a fine powder, it is subjected to a solution of potassium cyanide. When silver ores have been washed with salt, a solution of sodium hyposulphite is used to dissolve the silver chloride. See ALUMINUM; AMALGAM; ANTIMONY; COPPER; IRON AND STEEL; GOLD; LEAD; MERCURY; SILVER; ZINC; BLAST FURNACE; REVERBERATORY FURNACE.

Metaphysics, *Met" a fiz' iks,* the name given that phase of philosophic study which deals with first principles or the nature of reality. The name itself is accidental, being derived from the fact that in Aristotle's system this subject was treated after (*meta*) physics. The term is used in both a narrower and a wider sense. In the former, it deals with the ultimate nature of *being,* and is synonymous with *ontology;* in the wider sense it is used to include also the theory of *knowledge;* that is, *epistemology.* The restricted use is the more common. The two widely demarked metaphysical theories are: *materialism,* which maintains that the nature of ultimate reality may be expressed in terms of matter and motion; and *idealism,* which finds a psychical basis for reality. These two main theories are held in many special varieties and gradations. See PHILOSOPHY; MATERIALISM; IDEALISM; RATIONALISM; REALISM; EMPIRICISM.

Me'teor, a term applied to any body that enters the earth's atmosphere from without, and, becoming intensely heated by its swift flight through the outer air, is made visible as a spark and is consumed before reaching the ground. Sometimes meteors are seen to separate into pieces or burst like exploding shells. They vary greatly in size, the majority of them weighing probably not more than a single grain, while other bodies are of enormous size. Some of them reach the earth's surface. They are then called meteorites. The meteorites are found to be composed of known chemical elements, iron usually being present. There are numerous theories which attempt to explain the appearance of meteors. It is generally believed that a vast accumulation of meteoric matter moves in an orbit about the sun, and that the periodic showers seen in August and November appear when the earth in its progress approaches this orbit. The unusually brilliant showers occurring every 33 years are probably due to lack of uniformity in distribution of the meteoric material and the occurrence of large numbers of meteors at intervals along the orbit. When the earth approaches one of these groups its attraction for the smaller bodies causes a meteoric shower.

Me"teorol'ogy, the science which treats of the conditions of the atmosphere. It may be regarded as a department of physics. Its greatest practical value lies in furnishing data for weather forecasting; and it was the urgent need for such forecasting which first led to a systematic study of certain atmospheric phenomena. Meteorology has only within very recent times developed into an independent science.

Meteorological phenomena may be said to result from the interaction of solar heat, atmospheric moisture and the centrifugal force due to the earth's rotation. The various items which furnish data for this study and which determine the total meteorological condition of the atmosphere are called meteorological elements. These elements are: temperature, humidity, evaporation, cloudiness, precipitation, wind direction and wind velocity, atmospheric electricity, etc. The conditions and properties of the air cannot be perceived with accuracy by the senses; for instance, sensible temperature, or temperature as it feels to the body, is not always the absolute temperature registered by the thermometer. For the collecting of meteorological data,

therefore, delicate recording instruments are necessary. The most important of these are the thermometer, which measures atmospheric heat; the barometer, which records air pressure; the psychrometer, an apparatus for ascertaining the amount of humidity in the air, also the amount of its evaporation; the hydrometer, an instrument for weighing liquids; the rain gauge, which measures the amount of rainfall; and the anemometer, a device for testing wind velocity.

The practical results of meteorological investigation are shown in the reports published by various governmental weather bureaus, chief among which are those of Great Britain, Germany, France, Italy, Austria-Hungary, Russia, India, Argentine Republic, Canada and the United States. The sum which these countries annually expend for the maintenance of meteorological stations, together with that contributed by private funds, amounts to about $6,000,000. This does not include the amounts expended on the several important municipal observatories. In addition to these practical and material advances, contributions to theoretical meteorology have been made by numerous eminent physicists. Chief among those of more recent times are Adolph Erman, Joseph P. Espy, William Ferrel, J. C. Redfield and Lord Kelvin. The study may be said to be still in its infancy, but the present outlook promises important advances for the future. See WEATHER BUREAU.

Me'ter. See MET'RIC SYSTEM.

Meth'ane. See FIRE DAMP.

Meth'odists, the members of various churches which have sprung from the religious movement in England led by John Wesley (See WESLEY, JOHN). Wesley, however, did not aim to establish a new church, but hoped to unite Christians of all classes into Societies for the purpose of religious development. The name Methodist was applied by Oxford students to Charles Wesley and a few companions who lived so strictly as to seem to guide their lives by "method." The first Society was organized in 1739 and others followed. A few Christians would meet in classes (the origin of the Methodist class meeting) to pray and talk of spiritual matters. Over these a leader was appointed to give counsel and direction. The various leaders were appointed by John Wesley, but were independent of each other. In 1743 Wesley formulated the rules for the United Societies. In 1784 the new denomination became legally known as the Wesleyan Methodist Church, the name still retained in Great Britain and certain of her colonies. In 1906 the Wesleyan Methodists in Great Britain numbered 536,612.

METHODIST EPISCOPAL CHURCH. In 1784, Thomas Coke was ordained by Wesley as superintendent for America. A Christmas Conference was held at Baltimore, Md., in 1784-85, at which the Methodist Episcopal Church was instituted, an Episcopal Church constitution being drawn up. Since then the Church has had a marvelous growth, both in numbers and in wealth. The United States is divided into conferences, and each conference into districts. The bishops have general oversight of the conferences in the territory over which they preside, while the districts are in charge of district superintendents. Every four years a general conference is held, for the regulation of matters pertaining to the Church as a whole. The chief doctrines of the Church are a belief that all men are sinners; that God loves all men, though hating their sin; that salvation comes from belief in Christ as the personal savior of mankind; that salvation is free to all who repent; that the Holy Spirit works upon the hearts of men to incline them to repentance. The Church is active in missionary and educational work. In 1916 the Methodist Episcopal Church reported a membership in the United States of 3,718,986.

At various times there have been divisions in the Methodist body. The most important of these occurred before the Civil War, when the question of slavery divided the Church and the Methodist Episcopal Church, South, was organized. Another division occurred

in 1860, as a reaction toward primitive Methodism, resulting in the organization of the Free Methodist Church. The colored Methodists have had an organization of their own since 1816 (See AFRICAN METHODIST EPISCOPAL CHURCH). Other minor bodies are the Methodist Protestant, Congregational Methodist, Colored Methodist Episcopal and Union American Methodist Episcopal. The total membership of all Methodist bodies in the United States is over 7,000,000.

Methu'en, Mass., a town of Essex Co., 2 m. n.w. of Lawrence and 30 m. n. of Boston, on the Spicket River and on the Boston & Maine Railroad. It is a popular residential town for the near-by large cities. Chief among the manufacturing establishments are a bell foundry, cotton and woolen mills, an organ factory, hat, yarn and basket factories, a knitting mill and boot and shoe factories. The Nevins Memorial Library and the Nevins House for the Aged and Incurables are located here. The town was settled in 1641 but was a part of Haverhill until it became the town of Methuen in 1725. Population in 1920, U. S. Census, 15,189.

Met'ric System, a system of weights and measures whose name is derived from the name of the unit of length, the meter. The metric system is of French origin and is based upon measurements of a quadrant, or one-fourth of a meridian, taken by French mathematicians and engineers in 1736. The meter is one ten-millionth of this distance, 3.28 ft., or 39.37 inches. Later measurements have shown that the original figures are $\frac{1}{208}$ of an inch out of the way, but the change has not been made in the metric system.

The unit of the capacity of the metric system is the liter, a cube whose edge is one-tenth of a meter, and that of weight is the gram, the weight of a cubic centimeter of pure water at its greatest density. These standards were adopted in France in 1799 but were not rendered obligatory until 1837. The great simplicity of the metric system consists in its ratio of ten between the successive denominations and in the identity of the prefixes added; thus the prefixes above the unit are, respectively, deka—(10), hekto—(100), kilo—(1000), and myria—(10,000), all taken from the Greek. The subdivisions are from the Latin and are, respectively, deci—(.1), centi—(.01), and milli—(.001). The table of length of this system is therefore:

10 millimeters = 1 centimeter
10 centimeters = 1 decimeter
10 decimeters = 1 meter
10 meters = 1 dekameter
10 dekameters = 1 hektometer
10 hektometers = 1 kilometer

The tables of weight and capacity are similarly made by beginning with the milligram and milliliter, respectively. Because of its simplicity and its exact measurements the metric system is no doubt destined to be the universal system. Since its adoption in France its use is required in Germany, Austria-Hungary, Belgium, Chile, Argentina, Brazil, Peru, Mexico, Venezuela, Italy, Spain, Switzerland, Roumania, Servia, Norway and Sweden; its use is legalized in the United States, Great Britain, Russia, Japan, Turkey and Egypt. The metric system was made legal in the United States in 1866 but was not commonly used. In 1894 it became the standard of electrical units. It is now used almost entirely in weighing foreign mail, in mints, in government publications, in some measurements of the United States Coast and Geodetic Survey and in scientific work. A system of measuring angles by grades, dekagrades, hektogrades, etc., rather than by degrees, has been suggested but never put into practical use, owing to the vast amount of work necessary to reconstruct mathematical tables.

Met'ronome, an instrument employed when composing or studying music, the purpose of which is to denote, by marking time, the speed of the playing. It consists of a pendulum swinging on a pivot, below which is attached an immovable weight, and above on the bar is a sliding weight so adjusted as to regulate the length of swing and thus the speed of vibration. Motion is derived

by clockwork, or the metronome may be operated by hand. The tick or noise is audible to the player. See PENDULUM; MUSIC.

Metternich, *Met' er nik,* **Clemens Wenzel** (1773-1859), an Austrian statesman. He was educated at Strassburg and won his first claim to notice by representing the Westphalian nobles at the Congress of Rastadt. His diplomatic talent won him rapid distinction. At the age of 28 he was appointed Austrian minister to Dresden, and two years later he was sent to Berlin. After the peace of Pressburg he went as ambassador to Napoleon. Here his cool head and ability to keep his own secrets, while with a bland smile he obtained the secrets of others, stood him in good stead. When war broke out again between France and Austria, Napoleon detained him for a while. When set free he eagerly pressed on the war against Napoleon.

After the downfall of Napoleon, Metternich showed no interest in the German national sentiment which was arising, but by aiding in maintaining the boundaries of France as they had been, he tried to make Austria alone profit by the reassignment of European territory. After 1815 he was extremely reactionary, looking with suspicion upon the least popular demonstration. His government was overthrown by the Revolution of 1848, and he fled from Vienna to England. He returned in 1851, and, though his opinion was often asked by the Emperor, he was never invited to hold office again.

Metz, *Mets,* a city of France in the province of Alsace-Lorraine, capital of the District of Lorraine. It is situated at the confluence of the Seille and the Moselle rivers, and is built partly between the two rivers and partly on islands of the Moselle. Features of interest include a splendid esplanade with a fountain and statues, among others one of the great French general, Marshal Ney; a magnificent Gothic cathedral, begun in the 13th century; the church of St. Vincent, also dating from the 13th century; and the church of St. Constance. The city contains numerous educational institutions, including schools of art and music, a municipal library of many thousand volumes; and a municipal museum containing paintings and antiquities. The manufactures include leather and leather goods, hats, artificial flowers, weapons and cloth.

The Romans recognized the strategic importance of Metz and not only fortified it, but connected it by a system of military roads with important cities of Gaul, as Verdun, Rheims and Treves. The Huns under Attila, captured and plundered the city. It was an important city of Charlemagne's empire. By the Treaty of Verdun (843) it became the principal city of Lothair's kingdom and the name of the province in which it is situated commemorates that kingdom. When Lotharinga was crushed, between the Germans on the east and the Franks on the west, Metz with Lorraine was for centuries in the possession of first one and then the other of these powers. For centuries it was a free and prosperous city.

The Treaty of Westphalia (1648) gave it to France. It passed under control of Germany as part of the spoils of war, by the Treaty of Frankfort 1871. The collapse of Germany in 1918 restored it to France. Population, about 70,000.

Mex'ican War, the war fought between the United States and Mexico, April, 1846, to September, 1847. The struggle was actually an aggression on a weaker power in order to gain more territory for the proslavery party in the United States. Openly, however, the war was caused by the revolt of Texas from Mexico and its subsequent annexation to the Union, 1845, when it claimed, and was supported in this claim by the United States, that its natural boundary was the Rio Grande and not the Nueces River, as had been stipulated in the original Mexican agreements.

Shortly after James K. Polk became president, he sent Congressman Slidell to treat with President Herrera of Mex-

ico regarding indemnity for Texas. Also, he was to open negotiations for California. But as Slidell was not received, Polk ordered General Taylor, with 4000 men, to occupy the left bank of the Rio Grande. Here, near Matamoros, a small band of Americans was defeated by the Mexicans, Apr. 23, 1846, whereupon Polk declared that war existed "by the act of Mexico herself," and formal declaration to that effect followed .

On May 8, 1846, General Taylor, with 2000 men, defeated 6000 Mexicans under Ampudia and Arista at Palo Alto. This was the first important battle of the struggle and it was quickly followed by the Mexican defeat at Resaca de la Palma. The following September, Monterey fell after a short siege. During this time, General Kearny, with considerable aid from Fremont, had conquered New Mexico and upper California.

Meanwhile, Gen. Winfield Scott had assumed chief command in Mexico; Taylor, however, remained in control in the North, sending 10,000 of his men to aid Scott. Thus weakened, Taylor was attacked by the Mexicans under Santa Anna at Buena Vista, Feb. 23, 1847. The Mexicans were defeated and hurried to meet Scott at Vera Cruz. Scott, however, captured the city after a terrific bombardment, March 27, 1847, and a few days later began his triumphal march westward over the National Road to the City of Mexico. On Apr. 18 he defeated Santa Anna at Cerro Gordo, and other American victories followed in quick succession. Late in the summer Scott won a series of brilliant victories at Contreras, Churubusco, Molino del Rey and Chapultepec, entering the City of Mexico Sept. 14. This terminated the war.

The Treaty of Guadalupe Hidalgo was signed Feb. 2, 1848, Mexico relinquishing all the territory south of the 42nd parallel and west of the Louisiana Purchase for a consideration of $15,000,000. The United States also paid claims of American citizens against Mexico to the amount of $3,500,000. By the addition of the Gila Valley, which was subsequently bought for $10,000,000 (See GADSDEN TREATY), the United States secured, all told, about 900,000 sq. m. of territory.

Mexico, a republic of North America lying between the United States and Central America. Its broadly-curving eastern coast forms a part of the limits of the Gulf of Mexico, with its broad arm, the Gulf of Campeche, while at the west the long Peninsula of Lower California, partially separated from the mainland by the Gulf of California, is washed by the Pacific. The Rio Grande divides it from Texas, and the Hondo River at the south forms its natural separation from British Honduras. The area of Mexico is 767,005 sq. m., or about three times that of Texas.

PHYSICAL FEATURES. Mexico is a mountainous country having low, narrow coastal regions on both oceans, from which rise the various ridges of the great mountain system, a continuation of that of western United States. Centrally there is a broad plateau above which rise irregular mountain peaks not much elevated above the plateau. Hundreds of volcanoes, active, dormant and extinct, occupy the plateau and the plains. The highest of these lie southwest of the City of Mexico and include the Peak of Orizaba (18,250 ft.), Popocatepetl (17,876 ft.), Ixtaccihuatl (16,960 ft.), Volcán de Colima (12,750) ; the last of these has been active since 1900. Many are covered with snow throughout the year, and one, Ixtaccihuatl, has upon its summit the great Porfirio Diaz Glacier, the only one of great size in Mexico.

LAKES AND RIVERS. Mexico has few rivers of importance for navigation. The greatest is the great Rio Grande, but it is too much blocked by bars to be of value to any but small boats. It does, however, supply water for irrigation channels, and for this reason its bed is often almost dry. The Rio Conchas rising in southern Chihuahua is the greatest Mexican tributary of this stream. The Rio de Tampico and the San Juan are fairly large rivers, but are of little value for commerce be-

cause of their torrents and rapids. Probably the best-known Mexican stream is the Coatzacoalcos in the Isthmus of Tehuantepec, which was once investigated as the possible beginning of an ocean to ocean canal. The lakes of Mexico are numerous. Lake Chapala in Jalisco is the largest, but the valleys, the plateaus and the craters of the volcanoes have their lakes of clearest blue, generally in settings unusually picturesque. Many of these are connected by canals and form waterways or parts of the fine irrigation system of the republic.

Climate. The Mexicans divide their country into the hot lands, temperate lands and frigid lands. The first are those that lie less than 3000 ft. above the sea level. There the climate is moist, hot and generally unhealthful. In the second, the temperate lands, which are at an elevation of from 3000 ft. to 7000 ft., the air is cool and pleasant and the climate equable. Snow is not uncommon even as far south as the City of Mexico, but it never lasts long. Earthquakes, though frequent, are usually slight.

Industries and Products. Agriculture may well become the chief industry of Mexico, for even at present, with the primitive methods employed, the country, especially in the "hot lands," yields abundantly. American capital has been attracted into Mexico and this, with the newly-established experiment stations of the agricultural department, has tended to improve methods of production. The natural products of Mexico are the great forests of palm, acacia, rubber, rosewood, mahogany, brazilwood, campeachy wood, ebony and ironwood, the cactus and such fruits as the mango, pomegranate, orange, pineapple, coconut and banana. Following in the wake of cultivation come the superior Mexican coffees, cocoa, sugar cane, agave, corn, wheat, maize and beans. Spice growing and tea culture give promise of becoming profitable.

Mexico is the greatest silver-producing country of the world. The modern methods of extraction have made the ores once thought to be valueless, now worth mining, and in one region the very streets of the cities that had been paved with tailings from the old mines were found to yield a profitable per cent of silver. The most productive mines are those of Guanajuato, El Oro, Pachuca, Santa Eulalia, Parral and Zacatecas.

One of the largest gold camps of America occurs at El Oro, and in many localities lead, iron, copper and zinc are produced in great quantities. The copper mines are chiefly in Lower California. The Mexico mining laws have been continually improved until they are now advantageous to foreign capital, and to this is due the rapid growth of the mining industry. In the region of Vera Cruz are oil wells, remarkable for their production.

The manufactories of Mexico are extensive. The making of textiles is the leading one among these, but the weaving and the dyeing of the cloth is often carried on in private homes. The dyeing of the purple goods is an occupation by itself, for the dye is collected from a species of mussel similar to that which produced the royal purple of the East. The collectors go to the tiny islands where the mussels are common and carefully remove the animals, shells and all, from the rocks. By blowing into the shell the men cause the mussels to exude a few drops of the liquid that forms the basis for the dye. The mussel is then tenderly returned to the rock to await another collecting day. Sugar, rum, molasses, distilled liquors, rope and tobacco are manufactured in the south, and everywhere saddlery, boots and shoes and artistic pottery and jewelry are made and presented for sale.

Transportation and Commerce. Mexico presents many contrasts in transportation. Up the Coatzacoalcos go the picturesque tall-prowed dugouts of the natives, side by side with modern steamers and sail boats. Along the great railroads, now all united under the name of National Lines of Mexico, the elegant Pullmans, equipped with every conven-

1 Plowing 2 Straw Roofed Dwellings 3 Public Washing Place

MEXICAN SCENES

1 Pyramid of the Sun 2 Stone Sails 3 Mural Carvings

MEXICAN ANTIQUITIES

ience of the modern train, flash past the winding roads, where the natives carry their heavy packs, and the swift automobiles pass the long mule trains jangling their discordant bells. There are about 16,000 m. of railroads and long lines of telephone and telegraph connecting all the cities with the outer world.

PEOPLE AND RELIGION. The inhabitants of Mexico are of many classes, whites, Indians and mestizos, or mixed races. The Indians are the descendants of once-powerful tribes. They differ greatly in dress and in customs and, in general, have little of the energy, executive ability and skill of their ancestors. Many of these dwell in villages in Yucatan and the Isthmus of Tehuantepec, where they live by agriculture and by trading. The Zapotecas are the most intelligent of the tribes and are a gentle, hard-working and refined people. The Mexicans are of widely different classes. The wealthy class has always furnished the rulers and the higher officers of the army. These are of Spanish and Indian descent, aristocratic in looks and in bearing and much like their Spanish ancestors. They have acquired their wealth from the natural resources of the country and through the force of arms. The poorer classes are, in general, inefficient and lazy. By contrast, however, they are excitable, fond of bright colors and gayety, and are easily influenced.

The Roman Catholic religion prevails, though the greatest religious freedom is allowed. The Indians have nominally adopted Catholicism, but the most of them still cling to their ancient superstitions.

GOVERNMENT. Mexico is a constitutional republic, a federative republic made up of 27 states, three territories and a Federal District. Its model is the United States Government, and its executive power is vested in a president and vice-president, who, because of the character and traditions of the people whom they govern, are almost autocratic. The legislative department is vested in a Congress made up of a House of Representatives and a Senate. The executives are elected for six years, and the congressmen for two. Congress meets twice annually, and a permanent committee of both houses meets during the interim of sessions. In the absence or disability of the president and vice-president to perform their duties, Congress calls immediately for new elections, which are to be held as soon as possible. Each state has its own internal constitution, government and laws, with a governor, Legislature and judicial bodies. The constitutions are based upon the Federal Constitution and uphold its principles. The principal cities are Mexico, Guadalajara, Puebla, San Luis Potosi and Monterey.

HISTORY. Mexico is a country of an old civilization, and as early as the seventh century a people known as the Toltecs lived in the region of the northern rivers. The name of the country is derived from that of a tribe of Indians also found in the North and called the Mexicas, or Aztecs; they must have entered Mexico as early as the 12th century and soon after laid the foundations of Mexico City. Even this early, Mexico was a land of poverty, famine, jealousies and conflicts. It was conquered by Spain in 1521, and for nearly 300 years was under the domination of viceroys and governors, each having a period of government that averaged scarcely more than five years. These rulers and their followers robbed the mines, oppressed the people and checked all attempts at Mexican independence until the beginning of the 19th century. In 1810 Hidalgo, a Mexican patriot, incited a revolt that resulted, after 11 years of desperate fighting, in gaining independence for Mexico. For three years there was a monarchial form of government; then, in 1824, the Republic of Mexico was established, although on a rather uncertain basis. For many years Santa Anna was the leading spirit in Mexican politics (See SANTA ANNA, ANTONIO LÓPEZ DE), and he sometimes exercised arbitrary powers. In 1835 Texas, which had formed a part of Mexico, declared its freedom, and when it united with the United States,

war broke out between the two countries, Mexico, which during the war had 12 executives, was defeated. By the Treaty of Guadalupe Hidalgo, Feb. 2, 1848, Mexico received $15,000,000 and lost part of the present Colorado, Wyoming, Arizona and New Mexico and all of Utah and Nevada.

After many years of political uncertainties, during which the Constitution of 1857 was adopted, Maximilian of Austria was asked to become emperor. In 1867 he was executed, and Mexico again became a republic (See MONROE DOCTRINE). Porfirio Diaz took the office from his predecessor by force in 1876, and was elected president the following year (See DIAZ, PORFIRIO). With the exception of four years (1880-1884), Diaz was in office until 1911. He ruled with a strong hand, and the Government of Mexico was put on a firmer basis than formerly. An insurrection, headed by Francisco Madero, led to the retirement of Diaz, and he resigned in May, 1911. In February, 1913, Madero was deposed and executed. The revolution which accomplished this was headed by Victoriano Huerta and Felix Diaz, a nephew of Porfirio Diaz. Huerta assumed the office of provisional president, but almost immediately a revolt against him broke out. The revolutionists, who called themselves Constitutionalists, were headed by Venustiano Carranza. Francisco Villa led the forces in the field. During the revolution the American flag suffered insults from the Mexican Federalists, and in April, 1914, Vera Cruz was occupied by United States troops. A probable war between the United States and Mexico was averted by the offer to mediate on the part of Brazil, Argentina and Chile. The mediation conference, which was held at Niagara Falls, Canada, from May 20 to July 1, accomplished little, but the continued success of the Constitutionalists led finally to the resignation of Huerta (July 15, 1914). He appointed as his successor Francisco Carbajal. The latter was soon compelled to resign, and on Aug. 15 the Constitutionalists took possession of Mexico City. General Carranza then became provisional president. Population in 1911, 15,063,207.

Mexico City, the capital of the Republic of Mexico, on a plateau 7350 ft. above sea level, about midway between the Gulf of Mexico and the Pacific Ocean and 1225 m. s. of El Paso, Tex. Mexico has one of the most beautiful sites of any city in the world. From it can be seen the snow-capped peaks of the Cordilleras, the most prominent among them being Popocatepetl and Ixtaccihuatl. The altitude gives the city a pleasant and equable climate. It is regularly laid out, and the modern portion is characterized by good buildings, which are distinctly Spanish in their style of architecture. The Plaza Mayor, or Great Square, is the center of civil and social life. Around this are the Cathedral, one of the finest churches in America; the municipal palace or city hall; and the National Palace. The buildings of the city are massive, but they seldom exceed two stories in height. The city is well drained and has a good system of waterworks and public schools; and the National Museum has a very complete collection of Aztec antiquities. There are also a school of mines, schools of emergency and medicine, an observatory and a national theater. The manufactures are chiefly cotton goods, linens, silks, hats, paper, pottery, leather and gold and silver plate. Population in 1910, 470,659.

Mexico, Gulf of, a large and partly enclosed basin of the Atlantic, with the United States to the north and Mexico to the west and south. It opens into the ocean through the Strait of Florida, between Florida and Cuba, and into the Caribbean Sea through the Yucatan Channel, between Cuba and Yucatan. Its length from east to west is about 1000 m., with a continuous coast line of about 3000 m. The estimated area is 600,000 sq. m.; the maximum depth, 12,700 ft. It receives the Mississippi, Rio Grande, Colorado of Texas, Appalachicola, Brazos, Mobile and Sabine rivers. Among the islands of importance are the Florida Keys and those lying along the Yucatan

coast. The shores are so low that there are few good harbors, except those of Galveston, Mobile, Tampa, Pensacola and Vera Cruz. In winter furious gales prevail, coming as reflex storms from the tropics. The Gulf Stream, entering by the southern passage and curving around the Gulf until it finds an exit through the Strait of Florida, heats its waters to eight or nine degrees higher temperature than the waters of the Atlantic in a corresponding latitude. See GULF STREAM.

Meyer, *Mī' er,* **George von Lengerke** (1858-1918), an American diplomat, born in Boston, Mass. He graduated from Harvard University and went into business. His election to the Common Council of Boston was the beginning of his political career, after which he entered the Legislature of the state and was made speaker of the House. In 1900 President McKinley appointed him ambassador to Italy. Five years later he was ambassador to Russia, and in 1907 he succeeded George B. Cortelyou as postmaster-general of the United States. In 1909 Meyer became secretary of the navy.

Miami, *Mi am' y,* or **Great Miami,** a river of Ohio rising in Hardin County and entering the Ohio in the southwestern part of the state. It is about 200 m. long. Hamilton, Dayton, Troy, Piqua and Sidney are the principal cities on its banks.

Miami, Fla., a city and county seat of Dade Co., 156 m. n.e. of Key West and 366 m. s. of Jacksonville, at the mouth of the Miami River, on the west shore of Biscayne Bay and on the Florida East Coast Railway. Steamship lines connect with various Atlantic coast ports, and there is a direct steamer connection for Havana, Cuba, and Nassau in the Bahama Islands. Miami, known as the "Magic City," is situated in a fertile agricultural region surrounded by orange, grapefruit and coconut groves, pineapple plantations and truck farms. Fish are shipped in large quantities, and in Biscayne Bay are important sponge fisheries.

Miami is one of the most popular of the Southern winter resorts, and the city contains palatial hotels, beautiful residences, a city hall, courthouse, postoffice, numerous banks, handsome churches, modern schools and substantial business blocks. There is pure artesian water and gas for light and fuel. Bay Boulevard, Royal Palm, Biscayne and Lawrence drives are among the noted drives of the city. Miami is the trading point of the Seminole Indians. Drainage canals, 50 ft. wide and 10 ft. deep, have been constructed from Lake Okechobee, north of the city, to tidewater, to drain the Everglades. These drainage canals were completed in July, 1913. With the improvement of Miami Harbor by the Federal Government and donations by Henry M. Flagler, builder of the East Coast Railway, the city became one of the important shipping points on the South Atlantic Coast. The first settlement was made in 1896 when the place was chosen as the southern terminal of the railroad. Population in 1910, 5471; city census, 1920, 29,549.

Miami and Erie Canal. See CANAL.

Mica, *Mī' ka,* a group of minerals of complex and variable composition, consisting chiefly of aluminum silicate together with potassium, sodium, iron and magnesium. Mica is found in nearly all kinds of igneous rocks. The crystals are usually in the form of hexagonal scales, which may easily be reduced to remarkable thinness by continued splitting parallel with the base. Mica ranges from the transparent, colorless variety, known as muscovite, to an opaque red, yellow, green, brown or black. It is highly elastic, flexible and tough, a poor conductor of heat and of electricity.

Muscovite is the chief commercial species. It is used for lamp chimneys, gas burners, stove and lantern windows, as an absorbent of nitroglycerin in the manufacture of dynamite and for lubricating and insulating purposes. Formerly it was used for windowpanes of houses. For decorative purposes mica is made into spangles, ground into powder and used for producing a shining frostiness

on toys and stage scenery. Ground mica is also employed in the manufacture of paints and wall paper; while in sheet form it is used for lantern slides, for holding photograph films, as a transparent protective covering in place of glass and in innumerable other ways. The mining of mica is an important industry in India, where about one-half of the world's supply is produced. Canada and the United States yield about equally the remaining proportion.

Micah, *Mī' ka,* a book of the Old Testament, the author of which, Micah, was one of the 12 minor Hebrew prophets, who flourished during the reigns of Ahaz and Hezekiah. The prophecies have to do with both Israel and Judah and include forewarning of future judgment and prediction of the gathering together of all nations under the rule of the Messiah. Some modern critics dispute the authorship previously accepted, attributing to Micah only the first three chapters. See BIBLE, subhead *The Old Testament.*

Mica Schist, *Shist,* a metamorphic rock which forms in layers and is composed essentially of mica and quartz. The mica present is usually the colorless variety known as muscovite; biolite, the dark variety, occurs less frequently. Its property of being foliated, or arranged in layers, makes it easy to split. Numerous minerals are found embedded in it, notably garnet. Mica schist occurs in great abundance in mountainous regions. It is a chief constituent of the Appalachian and White mountains, giving to the latter a peculiar effect of whiteness (whence the name) caused by reflection. See WHITE MOUNTAINS.

Michelangelo Buonarroti, *Mī" kel an' jī lo Bwo" nar rot'ee,* (1475-1564), one of the most conspicuous figures in the history of art, was born at Caprese, the son of a poor but proud Florentine gentleman. He was a pupil of Ghirlandajo, and his art was influenced by the works of Donatello and Signorelli and the antique marbles in the gardens of his patron Lorenzo de' Medici; also by the poets and scholars of Lorenzo's brilliant court, by Savonarola, and by the teachings of Dante. His earliest important extant works are a *Pieta* (St. Peter's, Rome), *Virgin and Child* (Bruges) and *David* (Florence), the last a triumph of technical mastery. In 1508 Pope Julius commissioned him to decorate the ceiling of the Sistine Chapel of the Vatican, a monumental work, which engaged the artist four years. This and the *Last Judgment,* painted in the same chapel many years later, are his only important work with the brush. In many respects they are the most important frescoes in the world today, and yet the artist had declared that he was no painter. It was as a sculptor that he desired to be known. Here his unparalleled knowledge of the human form, and the grandeur and majesty of his style found full expression.

The number of his extant finished works is very small. Several pieces, which he is known to have executed, have either been destroyed or have otherwise disappeared. In the period of his greatness he was overwhelmed with commissions, few of which he could undertake. Many of his gigantic schemes were never carried out, owing partly to the turbulent state of the country, the vacillations of his patrons and his own physical limitations, which made it impossible for him to execute with his hand all that the creative impetuosity of his mind imposed; and with his fitful temper he could never keep assistants. The most important of his works are two tombs, one for Pope Julius II and the other for the Medici family at Florence. Neither was ever finished, but details of the Julian monument, the seated figure of Moses, representing the patriarch in a moment of righteous wrath, and two Slaves, intended as part of the frieze, are among his most impressive creations. The former is in the Church of San Pietro in Vincoli, Rome, the latter in the Louvre. The architectural repository for the Medici tomb was designed and carried out as to lighting and arrangements according to the artist's plans, and the general effect is

one of sublimity and grandeur. The tomb contains two colossal, symbolic figures representing Lorenzo and Guiliano de' Medici, which occupy two niches above groups of reclining figures resting on the sarcophagus and symbolic of Dawn, Evening, Day and Night.

In the last years of his life Michelangelo devoted himself entirely to architecture; he was appointed architect to St. Peter's in 1547, and designed the present dome, which was completed in accordance with his plans after his death. He died in Rome, the last great Florentine of the High Renaissance.

Michelet, *Meesh le',* **Jules** (1798-1874), a French historian, born in Paris. When only 23 years of age he became professor of history in the Collège Rollin, where he also filled the chair of ancient languages and philosophy, lecturing at other colleges occasionally. In 1830 he was given the care of the historical section of the archives of France, and eight years later he accepted the chair of history in the College of France. Michelet's great work is *The History of France.* He wrote also on natural history, *Woman, Love, Introduction to Universal History* and *Beginnings of French Law.* Many of his books have been translated into English.

Michelson, *Mi' kel sun,* **Albert Abraham** (1852-), a celebrated scientist, born in Germany and educated in the United States Naval Academy, at Berlin and Heidelberg universities and in France. He was successively professor of physics in the Case School of Applied Science, Cleveland, and in Clark University, and head of the department of physics in the University of Chicago. Among the many honors which have fallen to Dr. Michelson was the award in 1907, by the Swedish Academy of Sciences, of the Nobel prize of $40,000 for researches in physics.

Michigan, THE WOLVERINE STATE, also called *The Peninsula State,* is one of the East North Central States. The state is divided by the Great Lakes into two parts, known respectively as the Upper Peninsula and the Lower Peninsula. The Upper Peninsula is bounded on the n. by Lake Superior, on the e. by St. Mary's River and on the s. by the Straits of Mackinac, Lake Michigan and Wisconsin. The Lower Peninsula is bounded on the n. by the Straits of Mackinac, on the e. by Lake Huron, St. Clair River, Lake St. Clair, Detroit River and Lake Erie, on the s. by Ohio and Indiana and on the w. by Lake Michigan.

SIZE. The extreme length of the Upper Peninsula from east to west is 318 m. The greatest breadth is 164 m. The extreme length of the Lower Peninsula is 277 m. and its breadth is 187 m. The area of the state is 58,915 sq. m., of which 500 sq. m. are water. The coast line is over 1600 m., the greatest of any state in the Union. Michigan is almost the exact size of Florida, larger than Illinois or Wisconsin, about one-half the size of the United Kingdom and the 22nd state in area.

POPULATION. In 1920 the population was 3,668,412. From 1910 to 1920 there was a gain in population of 858,239, or 30.5 per cent. There are 63.8 inhabitants to the square mile and the state ranks seventh in population.

SURFACE. In the northwestern part of the Upper Peninsula is a low range of mountains known as the Mineral Range, extending into Wisconsin in a southwesterly direction. The northeast extension of this range forms Keweenaw Peninsula. The western part of the Upper Peninsula is generally rocky and uneven, but the eastern part is low, with a slight slope to the eastward.

The Lower Peninsula is generally undulating and contains but little high land. In the south-central part is a table-land having an elevation of about 400 ft. and extending into Ohio and Indiana. Northwest of Detroit is another small area of elevated land, and at that part of the peninsula between Saginaw Bay and Lake Michigan is a plateau, or table-land, which extends northward as far as Alpena and occupies about one-half of this part of the peninsula. Its highest point is about 800 ft. above the lake surface. The divide separates the rivers flowing

into Lake Huron from those flowing into Lake Michigan and extends north and south a little east of the median line. A depression which was formerly the bed of an old glacial river extends southwestward from Saginaw Bay to the mouth of the Grand River. Southwest Michigan is characterized by the valleys of the St. Joseph, the Kalamazoo and the Grand rivers, separated from each other by rolling elevations. The deepest indentation on the east coast is Saginaw Bay and on the west coast Grand Traverse Bay. The shores of Lake Michigan in many places contain sandhills, or dunes, of large proportions.

Rivers and Lakes. Most of the rivers are short and shallow. The streams flowing into Lake Michigan going from north to south are the Manistee, the Muskegon, the Grand, the Kalamazoo and the St. Joseph, and the Au Sable and the Saginaw are the chief rivers flowing into Lake Huron. There are many small but rapid streams throughout the state which are valuable for water supply and water power. The St. Mary's River belongs both to Michigan and to Canada. Michigan is estimated to have over 5000 lakes. These are generally distributed in the Lower Peninsula, 175 of them lying in the basin of the Kalamazoo River. Some of the most important of these lakes are Pine, Houghton, Mullets and Burts in the Lower Peninsula, and Manistique in the Upper Peninsula. These lakes are often valuable sources of water supply.

Scenery. The many clear lakes occupying valleys and plains and surrounded by forest-clad shores add much to an already pleasing landscape. Some of the streams have worn deep and interesting channels along their courses. On the southern shore of Lake Superior are the famous pictured rocks, consisting of cliffs of sandstone which have been worn into fantastic forms by wind and wave. At Sault Ste. Marie are the great rapids in the St. Mary's River, forming one of the most interesting waterfalls in the country. With few exceptions the Lower Peninsula is in a high state of cultivation, and contains thousands of orchards which add much to the beauty of the landscape.

Climate. The Upper Peninsula has a cool temperate climate with long, severe winters having heavy snowfall, and cool summers. The Lower Peninsula has a climate far different from that of most regions in the same latitude. Nowhere else is the influence of large bodies of water on climate more clearly shown than in Michigan. The winters are much milder and the summers much cooler than in other states of the same latitude. This equable climate to which Michigan owes her excellent fruit is due almost wholly to the influence of the Great Lakes. The mean temperature of the Lower Peninsula for July and August is 72°, and from 14° to 23° for January and February. The temperature of the western part of the Lower Peninsula is influenced by southwest winds which blow over Lake Michigan, and damaging frosts seldom occur for a distance of ten miles inland from the lake. The annual rainfall is 30 inches.

Minerals and Mining. The iron mines of the Upper Peninsula are second in importance only to those in Minnesota. On Keweenaw Peninsula are the famous Calumet and Hecla copper mines, and the supply of copper in this region is practically inexhaustible. Michigan is the second state in the Union in the production of iron ore and the third in production of copper (See Copper; Iron and Steel). Around Saginaw Bay and Manistee are extensive deposits of salt, and in the production of this mineral Michigan rivals New York. The salt is obtained by dissolving it in water, then evaporating the brine. Around Grand Rapids are large deposits of gypsum. Clay suitable for making brick is widely distributed. Marl occurs in the southern part of the state and cement rock in various places. Grindstones are quarried along the shore of Lake Huron and there are coal fields of considerable proportions in the central part of the state.

Forests and Lumber. Formerly the northern part of the Lower Peninsula and a good portion of the Upper Pen-

Area, 58,915 sq. m.
Population, 1910, 2,810,173
Inhabitants per sq. m., 43.9
First Settlement, St. Ignace, 1671
Organized a Territory, 1805
Admitted to Union, 1837
First Governor, Stevens T. Mason, 1835-1840

Chief Cities	Population 1910
Lansing	31,229
Detroit	465,766
G'd Rapids	112,571
Saginaw	50,510
Bay City	45,166
Kalamazoo	39,437
Flint	38,550
Jackson	31,433
Calumet	30,000
Battle Creek	25,267

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IMPORTANT PRODUCTS OF MICHIGAN

MICHIGAN

insula were covered with forests in which white pine predominated. At one time Michigan was the leading lumber-producing state. The pine has been practically exhausted, but south of the original pine forests there are large areas covered with forests and containing maple, elm, walnut, butternut, basswood, poplar, oak, birch and beech among the hard woods, and hemlock, cedar and tamarack among the soft woods. In these forests lumbering is still an important industry. Pine and spruce not suitable for lumber are cut for the manufacture of wood pulp.

Agriculture. Agriculture is the leading industry of the state and gives employment to about one-third of the inhabitants. More than four-fifths of the farms are cultivated by their owners. The richest agricultural region is in the southern part of the Lower Peninsula.

Soil. Most of the soil is a rich loam. In the lowlands it is alluvial and very fertile. There are a few sections in which the soil is sandy.

Products. The most important field crops are hay and forage, corn, wheat, oats, sugar beets, chicory and potatoes. The state has a great variety of products. The western and central parts of the Lower Peninsula contain extensive orchards, and apples, peaches, pears, plums and cherries of excellent quality are raised in large quantities. Michigan is also one of the leading states in the production of strawberries, raspberries, currants, grapes and other small fruits. Vegetables are raised in the southern part of the state. Michigan leads in raising lettuce, peas, beans, celery and peppermint. Celery is grown both in the Lower and Upper peninsulas. In the central part of the Lower Peninsula sugar beets are raised in large quantities, and Michigan is one of the foremost states in the production of sugar.

Raising live stock is an important industry and large numbers of cattle, hogs and sheep are found throughout the state. Among the states east of the Mississippi, Michigan is second only to Ohio in the production of wool. Dairying is extensively carried on and the yearly income from the dairies is about $17,000,000. The income from poultry and eggs is about $11,000,000.

Fisheries. The position of Michigan with reference to the Great Lakes and her numerous inland lakes make the fishing industry an important one. The most numerous fish taken from the Great Lakes are trout, herring, whitefish and perch. State and Federal hatcheries are found within the state and there are numerous laws designed for the protection of the fishing industry.

Manufactures. Within the last few years manufacturing has developed rapidly and Michigan is an important manufacturing state. Grand Rapids is the largest center in the world for the manufacture of furniture and sticky fly paper. Another important center for furniture is Muskegon. A very important branch of the furniture business is the manufacture of filing systems for offices and of sectional bookcases. Prepared foods are manufactured in large quantities in and around Battle Creek.

Detroit, Flint and Lansing are noted for the manufacture of automobiles, and in Detroit, which is the chief industrial center, stoves, chemicals, leather, boots and shoes and numerous other articles are manufactured. There are shipyards at Detroit, Port Huron and Wyandotte. In the Detroit yards are built some of the largest ships on the Great Lakes. At Belding are valuable silk mills. In Bay and Saginaw counties there are extensive salt works.

Summer Resorts. Michigan's delightful summer climate, beautiful lakes and pleasing landscapes and her proximity to Chicago and other large cities make her one of the most popular states in the Union for summer recreation. Within her borders are found resorts which have attained a wide reputation. Foremost among these is Mackinac Island, long celebrated for its beauty and its historical associations and as a social center during the tourist season. During the summer this is one of the most important passenger ports on the

Great Lakes. Other places of note are Petoskey, Ludington, St. Joseph, Benton Harbor, South Haven and Saugatuck. The shores of many of the inland lakes are lined with cottages which are the summer homes of thousands of people from large cities, who seek rest and recreation within the quietude of these beautiful bodies of water.

TRANSPORTATION AND COMMERCE. The cities and large towns on the shore of Lake Michigan have direct connection with Chicago by steamer, and Grand Haven and some other cities have similar connection with Milwaukee. Alpena, Bay City, Saginaw and other towns on Lake Huron have steamer connections with Detroit, Toledo, Cleveland, Buffalo and Mackinac Island. The Detroit River is the busiest waterway in the world, carrying more shipping than any other body of water, notwithstanding that it is open to navigation only eight months in the year. At Sault Ste. Marie is the greatest lock in the world, with the exception of that on the Isthmus of Panama, and the shipping there exceeds that on the Suez Canal. Both the Upper and Lower peninsulas are well supplied with railways extending through them in all directions. In the Lower Peninsula the principal systems are the Michigan Central, the Lake Shore & Michigan Southern, the Grand Trunk, the Pere Marquette and the Grand Rapids & Indiana. In the Upper Peninsula are the Chicago & North Western, the Chicago, Milwaukee & St. Paul and the Soo. These systems with their cross lines and a few local lines provide the state with ample railway facilities. Detroit is the chief railway and commercial center. Grand Rapids is next in importance, and Battle Creek, Kalamazoo, Lansing and Saginaw are also important railway centers. In the southern part of the state numerous electric lines connect adjoining cities.

The commerce of the state consists chiefly in supplying surrounding markets with the agricultural products, including dairy products, fruits and vegetables, and with various manufactured goods. Some of these manufactures, however, such as furniture, automobiles, stoves and boots and shoes, are sent to all parts of the country. The imports consist of coal, raw material for manufactures, textiles and such other manufactured products and foodstuffs as cannot be produced with profit within the state.

GOVERNMENT. The present constitution was adopted in 1909. The executive department consists of the governor, lieutenant-governor, secretary of state, auditor, attorney-general, treasurer and superintendent of public instruction, all elected for two years. Boards of commissioners and many state officers are appointed by the governor. The Legislature consists of the Senate of 32 members and the House of Representatives of 100 members, all elected for two years. The sessions are biennial and are unlimited.

The judicial department consists of the Supreme Court of eight judges elected for eight years, one being elected every two years, and a Circuit Court for each judicial district, with one or more judges elected for six years. There is a Probate Court in each county and justice courts are provided in each township.

EDUCATION. The public schools are under the general supervision of a state superintendent of public instruction and the schools in each county are under the direction of a county commissioner, elected for four years. Each county has a board of examiners consisting of the county commissioner and two members appointed by the county supervisors. This board grants certificates to teachers within the county. There are also township boards of education and each district has a board consisting of three or five members. The graded schools throughout the state are excellent and the rural schools maintain a high standard and are taught by trained teachers. The teachers' college at Ypsilanti is the oldest normal school west of New York. State normal schools for training teachers of the elementary schools are maintained at Kalamazoo, Mt. Pleasant and

Marquette. The state university, one of the best in the Union, is at Ann Arbor. The agricultural college is at Lansing and the state school of mines is at Houghton.

The leading educational institutions not under control of the state are the Detroit College, Albion College, Adrian College, Alma College, Hillsdale College, Kalamazoo College, Olivet College, and Hope College at Holland.

STATE INSTITUTIONS. The hospitals for the insane are at Kalamazoo, Pontiac, Traverse City and Newberry. The school for the deaf and dumb is at Flint and that for the blind is at Lansing. The state public school for dependent children is at Coldwater. The home for the feeble-minded is at Lapeer. The state soldiers' home is at Grand Rapids. The penitentiaries are at Jackson and Marquette. There is a house of correction at Ionia, an industrial school for boys at Lansing and an industrial school for girls at Adrian.

CITIES. The chief cities are Lansing, the capital; Detroit, Grand Rapids, Saginaw, Bay City, Flint, Kalamazoo, Muskegon, Port Huron, Battle Creek and Manistee in the Lower Peninsula; Laurium, Ishpeming, Marquette, Escanaba, Menominee, Hancock and Ironwood in the Upper Peninsula.

HISTORY. Michigan, named for the lake, the Algonquin "great sea," was visited as early as 1610 by French Jesuits and traders. A mission, temporarily founded at Sault Ste. Marie in 1641, was renewed by Marquette in 1668. Three years later St. Ignace was settled, Detroit following in 1701. By the Treaty of 1763, the territory passed into the hands of the English. Then Pontiac's followers destroyed Mackinac and besieged Detroit for weeks. In 1774 the territory became part of Quebec, only to revert, in 1783, to the United States. After having been a part, in turn, of the territories Ohio and Indiana, what is now the Lower Peninsula of Michigan was cut off from Indiana and organized independently, 1805. Michigan was conspicuous in the War of 1812. Instead of a strip of 600 sq. m., including Maumee Bay and Toledo, which Ohio and Michigan both wanted, Michigan was given its Upper Peninsula. Jan. 26, 1837, it became a state; during the decade up to 1840, its population grew from 30,000 to 212,000. In 1847 the capital was moved from Detroit to Lansing. By a constitutional amendment of 1853, the manufacture and sale of intoxicants was prohibited. This was repealed in 1876, but by virtue of a local option law about one-half the counties prohibited the sale of intoxicating liquors. Michigan sent about 91,000 men to the Union armies during the Civil War. Since that time its chief concerns have been taxation and the regulation of corporations, due to its rapid industrial development. Consult Cooley's *Michigan*.

GOVERNORS. Stevens Thompson Mason, 1835-1840; William Woodbridge, 1840-1841; James Wright Gordon, 1841-1842; John Steward Barry, 1842-1846; Alpheus Felch, 1846-1847; William L. Greenly, 1847-1848; Epaphroditus Ransom, 1848-1850; John Steward Barry, 1850-1851; Robert McClelland, 1851-1853; Andrew Parsons, 1853-1855; Kinsley S. Bingham, 1855-1859; Moses Wisner, 1859-1861; Austin Blair, 1861-1865; Henry Howland Crapo, 1865-1869; Henry Porter Baldwin, 1869-1873; John Judson Bagley, 1873-1877; Charles Miller Croswell, 1877-1881; David Howell Jerome, 1881-1883; Josiah W. Begole, 1883-1885; Russell Alexander Alger, 1885-1887; Cyrus Gray Luce, 1887-1891; Edwin Baruch Winans, 1891-1893; John T. Rich, 1893-1897; Hazen Smith Pingree, 1897-1901; Aaron Thomas Bliss, 1901-1905; F. M. Warner, 1905-1911; C. S. Osborn, 1911-1913; W. N. Ferris, 1913-1917; A. E. Sleeper, 1917-1921; A. J. Groesbeck, 1921—.

Michigan City, Ind., a city of Laporte Co., 40 m. s.e. of Chicago, on Lake Michigan and on the Lake Erie & Western, the Pere Marquette, the Michigan Central, the Chicago, Indianapolis & Louisville and other railroads. The excellent transportation facilities contribute to the commercial and in-

dustrial growth of the city. It has a large trade in iron ore, lumber and salt, and extensive manufactories of railroad cars, furniture, barrels, hosiery, knit goods, shirts, gloves and lumber products. The workshops of the railroads which converge at this point are located here. The city contains the Northern Indiana State Prison, a United States life-saving station and a public library. During the summer it has steamboat connection with Chicago, and it is a popular excursion point and summer resort. It was settled in 1833, incorporated in 1837 and received a city charter in 1867. Population in 1920, 19,457.

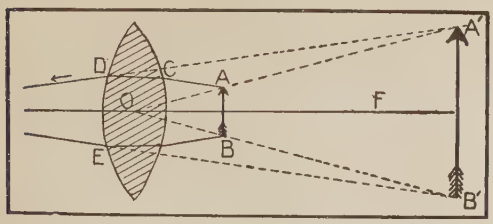
Michigan, University of, at Ann Arbor (1837). This university was established by the first Legislature of the state and opened to students in 1841. It maintains colleges of literature, science and arts, law, medicine, surgery, engineering, pharmacy, dentistry, forestry and a graduate school. The first four of these colleges were the ones originally established. The university is controlled by a board of eight regents elected, two biennially, by the people of the state. It has a library of over 300,000 volumes and property valued at $7,697,000. The University of Michigan was the first of the state universities as the term is now understood, and has led in the development of a broad and democratic spirit in secondary, higher and professional education; it was the first great university to become coeducational, admitting women in all departments upon an equal footing with men in 1870. In these and in many equally progressive movements it has made its influence felt in all parts of the world. Aside from the usual college buildings, there are hospitals in connection with the medical schools, separate gymnasiums for men and women, well-equipped bontanical gardens, and an observatory, a summer camp, athletic fields, and a club house. The state schools of mines and of agriculture are at present under separate management, but their enrollment, about 2000, should be added to the 7500 of the university when comparison is made with other state universities.

Micrometer, *Mi krom' e ter,* a device which makes it possible to determine measurements of length more accurately than by using an ordinary rule or scale. It is employed in telescopes and microscopes as well as on surveying instruments, and forms a very useful tool for the machinist by which he can measure the diameter of shafts, etc., to an exactness of one-thousandth part of an inch. Micrometers are made in a variety of forms, but they consist principally of a very finely threaded, slender screw whose revolutions are counted or measured, or indicated on a scale. See MICROSCOPE; TELESCOPE.

Microphone, *Mi' kro fone,* an instrument for measuring the intensity of low sounds. One of the earliest forms of microphones was devised by D. E. Hughes in England in 1878, and consisted essentially of a rod of gas carbon standing upright, with its lower end resting on a carbon button and its upper end held by a carbon collar. These carbons resting on a resonance box coupled to a vibrating sounding board formed part of an electric current, which included also a telephone. This contrivance was made so sensitive that the tread of a fly on the resonance box could be distinctly heard. The modern telephone transmitter is essentially a microphone. See TELEPHONE.

Microscope, *Mi' kro skope,* an optical instrument for magnifying small objects. Microscopes are simple and compound. A simple microscope consists of a double-convex lens, usually so mounted that it is easily carried. The common pocket magnifier is a simple microscope (See LENS, subhead *Convex Lens*). With the simple microscope one views the object directly, and it is very effective for examining insects, flowers and other common objects; its magnifying power, however, is comparatively low, seldom exceeding 20 diameters, which is equivalent to increasing the surface 400 times. The illustration shows how the simple microscope magnifies. Light from the

object A B is refracted by the lens twice in the same direction, once on entering the lens as at C, and once on leaving it, as D and E. Rays entering the lens at the center O are not refracted. The eye follows the refracted rays back in



SIMPLE MICROSCOPE

a straight line to where they meet the rays from O, and there the magnified image A'B' is seen.

The compound microscope consists of an object glass and an eyepiece. These are mounted in tubes so fitted that the tube containing the eyepiece slides within that holding the object glass. The tubes are attached to a stand, which contains a stage for holding the object, beneath which is a small convex mirror for reflecting light upon the object. The stand contains a rack and pinion and a screw with a very fine thread, both of which are used in focusing the instrument. The object glass, or objective, forms a magnified image of the object, and the eyepiece forms a magnified image of this image. By extending the tube and thus increasing the distance between the objective and the eyepiece, the magnifying power of the instrument is increased. It may also be increased by increasing the power of the objective and of the eyepiece. Most compound microscopes are equipped with three objectives and one eyepiece, but this number can be increased if desired.

The microscope is in general use for determining adulterations in foods, the quality of steel, bacteria in disease, and for many other purposes.

Mi'das, in Greek and Latin myths, King of Phrygia. For finding and returning to Bacchus the latter's teacher, Silenus, the god granted him one wish. King Midas chose that whatever he might touch would turn to gold; but when he found that all his food became shining metal, he feared starvation and implored Bacchus to deliver him from golden destruction. Bacchus instructed Midas to bathe in a certain stream, and the golden touch left him upon his complying.

Thenceforth Midas hated wealth. He betook himself to the country, where he became the friend of Pan. In a musical contest between Apollo and Pan, Midas preferred the rustic melodies of the latter. This so angered Apollo that he transformed the King's ears into those of an ass. Midas hid his shame from all but his barber, whom he swore to secrecy under penalty of dire punishment. The barber, however, could not keep such interesting news; digging a hole in the earth, he whispered the story into it and covered it over, safely hidden, as he thought. Shortly afterward reeds sprang up on the spot. Swaying in the breezes, they murmured to all who passed by, "King Midas has ass's ears, ass's ears."

Middle Ages, The, a period of history extending from 476, the fall of the Roman Empire, to the beginning of the modern epoch, about 1450. The first centuries were called the Dark Ages, as the civilization of the ancient world seemed entirely submerged in the barbarism of the invaders of the Roman Empire. The feudal system was the main bond connecting the different classes of society, and war was the noblest profession of the times. Charlemagne lived in the last part of the eight century, and under him there was a revival of learning, which developed into the Scholasticism of the 12th and 13th centuries. The development grew more rapid in the 14th and 15th centuries and was in full tide in the 16th, the century of the Reformation and the Renaissance.

Mid'dleboro, Mass., a town and summer resort of Plymouth Co., 34 m. s.e. of Boston and 18 m. n.e. of Fall River, on the Nemasket River and on the New York, New Haven & Hartford Railroad. The town contains the

villages of North and South Middleborough, Nemasket, Four Corners, Waterville, Eddyville, Puddingshire, Rock and Thomastown. Three falls in the Nemasket River afford excellent water power for manufacturing purposes. The industrial interests are represented by boot and shoe factories, woolen mills, parlor-grate works, tile and varnish factories, an iron foundry and saw and planing mills. The town was settled in 1662 on the site of the Indian village, Nemasket, and is one of the oldest towns in the state, having been incorporated in 1669. Population in 1920, 8,453.

Middlesboro, Ky., a city of Bell Co., 64 m. n.e. of Knoxville, near the Tennessee border line, on the Southern, the Louisville & Nashville and other railroads. It is a mining and manufacturing city, with ironworks and extensive coal and coke interests. The city is much frequented as a summer resort. Population in 1920, 8,041.

Middletown, Conn., a city and county seat of Middlesex Co., 16 m. s. of Hartford, on the west bank of the Connecticut River and on the New York, New Haven & Hartford Railroad. It is connected with Portland on the opposite side of the river by an unusually long drawbridge. Middletown is situated in an agricultural region and the excellent water power has aided in making the place a manufacturing city. The river is navigable as far as Hartford for small vessels. The manufacturing establishments include bone goods, cotton webbing, pumps, hydraulic machinery, wool, cotton, silk and rubber goods, harness trimmings, bicycles, automobiles and marine hardware.

Middletown is the seat of the Wesleyan University (Methodist), founded in 1831, and of the Berkeley Divinity School (Protestant Episcopal). There is also an industrial school for girls. The Russell Free Library is located here. On a high hill about a mile southeast of the city are the imposing buildings of the Connecticut State General Hospital for the Insane. Previous to the Revolution and some time thereafter Middletown was an important commercial port, having considerable trade with the West Indies. It was settled in 1650 and a year later was incorporated as a town under the name of Mattabeseck. The name was changed to Middletown in 1653. It was given a city charter in 1784. Population in 1920, 13,638.

Middletown, N. Y., a city in Orange Co., 67 m. n.w. of New York City, on the Wallkill River and on the New York, Ontario & Western, the Erie and the New York, Susquehanna & Western railroads. It has fine public buildings and is the seat of the New York State Homeopathic Hospital for the Insane. An old ladies' home is also located here. Among its industrial establishments are car shops, straw-hat factories, saw and file works, cigar factories, milk condenseries, tanneries and wood-type and cut-glass factories. It was settled before the Revolution and named from its central location on the old Minisink road leading to the "Far West" of New York State. Population in 1920, 18,420.

Middletown, Ohio, a city of Butler Co., 34 m. n. of Cincinnati, on the Miami River, the Miami and Erie Canal and on the Cincinnati, Hamilton & Dayton and the Cleveland, Cincinnati, Chicago & St. Louis and other railroads. It has large manufactories of bicycles, tobacco, paper, sheet steel, agricultural implements, flour and dairy products. The Miami River affords excellent water power and has contributed largely in making Middletown a manufacturing city. It was settled in 1794. Population in 1920, 23,594.

Midge, *Mij,* a family of slender insects of the order Diptera. There are in all 18 species, seven of which are known in the United States. The larvæ may be seen in the swift currents of streams, where they lie close to the rocks and feed upon aquatic vegetation. Later they fasten themselves to the rock and become flattened, inactive pupæ. When ready to mature, the pupa case divides and rises slowly to the surface, where the adult gradually unfolds its narrow wings. The midges may be seen at twi-

light dancing in large swarms near the shores of ponds and small lakes. The name is often wrongly applied to any small and harmless but annoying insect. See DIPTERA.

Miff'lin, Thomas (1744-1800), an American Revolutionary patriot, born in Philadelphia. In 1772-74 he served in the State Legislature, and in 1774 was a delegate to the First Continental Congress. Enlisting in the army, he served during the Revolutionary War, and attained the rank of major-general. He was opposed to Washington's military policy, and was prominent in the Conway Cabal. In 1782 he was elected to Congress, in 1785 he entered the State Legislature again, and in 1787 he was a delegate to the Federal Constitutional Convention. He was governor of Pennsylvania from 1790 to the time of his death. See CONWAY CABAL.

Mignonette, *Min" yun et',* a fragrant herb of the Mignonette Family. It is a garden or house plant, with leaves varying in shape from round to oblong. The flowers of the common species grow in a spike and are greenish-white in color. Dyers' mignonette has a yellow flower, from which a yellow dye is made.

Migra'tion, as generally understood, the movement of large bodies of animals from one country to another or from one section to another for purposes of feeding or of breeding. The best known of such migrations are those of birds, which are of regular, annual occurrence (See BIRDS, subhead *Migration*). Birds are by no means the only animals that migrate, however. At the breeding season marine fish take to the coastal streams and fresh-water fish go to the deep sea to spawn.

The majority of migrations are for the purpose of finding new feeding grounds. Thus, in the great plagues of grasshoppers and locusts which often descend upon the agricultural states destroying every bit of green in sight, the number of the insects makes their constant advance necessary in order that food may be provided. The trails of antelopes, reindeer, hares, marmosets, elephants, chamois and the once common bison show the migrations of these animals when climatic conditions or change of season forced them to seek new fields. The sudden appearance of vast hordes of rats and mice and an overwhelming plague of bats are due, no doubt, to the same cause. Many insects, being light of body and small of size, are frequently blown by the wind, carried in wood or imported upon nursery stock and so carried from place to place. Such immigration is not truly migration, which is a wholly voluntary movement. One of the most unexplainable migrations is that of the lemmings in the Scandinavian Peninsula, since it costs the lives of the majority of the participants. See LEMMING.

Mi'lan, the chief city of Lombardy, the second largest city of Italy and the capital of the Province of Milan. It is situated on the great plain of Lombardy, on the Olona River, 166 m. w. of Venice. The changeable climate, with alternating hot winds in summer and cold winds from the frozen Alps in the winter, is somewhat trying. Excellent promenades and boulevards are maintained, among others the magnificent Via Dante. The New Park, once a national drill-ground, which contains the Anfitheatro dell' Arena, built by Napoleon I, has extensive promenades and a large pond, and is lighted by electricity. There are numerous beautiful churches, including the Gothic Cathedral, famous the world over, and comparable with the Cathedral of Santa Maria del Fiore at Florence and St. Peter's at Rome; the Church of Sant' Ambrogio, the Dominican Church of Santa Maria delle Grazie, containing the famous painting of the *Last Supper* by Leonardo da Vinci; the Church of San Giorgio al Palazzo; and the San Nazaro and San Sebastiano. The secular buildings include the Palace of Arts and Sciences (formerly the Brera Palace), with its extensive national library, the Borromeo Palace, the Royal Palace and the Archiepiscopal Palace, the Palace of Justice, the Exchange, the large Scala Theater and the famous

Conservatory of Music (Milan being the center of music of the country).

Milan possesses great wealth and is the chief financial city of Italy. The manufactures include leather, woolen goods, silk, machinery, furniture, glass and chemical products. Cheese, butter, eggs, poultry and grain are also marketed. The city is the center of the Italian book trade, and leads in modern sculpture. It contains the royal mint, a corn exchange and a tobacco factory.

Milan has been known to history since 222 B. C., when it was subdued by the Romans. In the third century A. D. Diocletian made it the capital of Italy. Constantine issued from Milan, in 313, the edict recognizing Christianity, and as the seat of a bishop it was long the home of the famous Ambrose. It obtained and held republican liberties until the 12th century and was the strongest among the city republics. Among its most famous princes were the Sforzas, well known for their patronage of learning and art, as well as for their cruelty. Milan became a Spanish possession in 1535, was later ceded to Austria, became the capital of the Cisalpine Republic under Napoleon in 1797 and the capital of the Napoleonic Kingdom of Italy in 1805. It was restored to Austria ten years later. In 1859 the Austrians yielded the city to Napoleon III after the Battle of Magenta, and he surrendered it and the whole of Lombardy to Sardinia. Population, about 663,059.

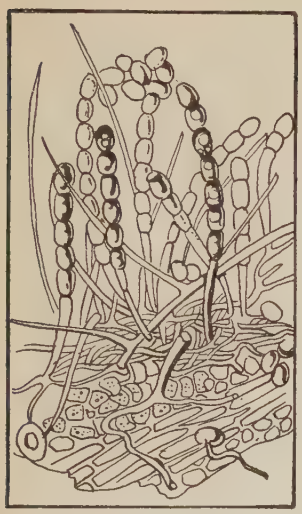
Milan Cathedral, a famous Gothic cathedral in Milan. Its form is that of a Latin cross, and it has a length of 486 ft. and a breadth of 287 ft. The tower is 356 ft. in height and commands a splendid view of the city, the Province of Lombardy and the distant Alps. The exterior of the cathedral is of white Carrara marble and the carvings are of unsurpassed beauty; it contains more than 2000 statues and 98 pinnacles. The foundation was laid by Gian Galeazzo Visconti in 1386, and the talents of the best European architects have contributed towards its perfection. Napoleon was crowned King of Italy within its walls in 1805.

Milan Decree, a decree issued by Napoleon Dec. 7, 1807, ordering the confiscation of any American vessel which submitted to search by a British ship, or which sailed for or from any port of Great Britain or her colonies. This order was in retaliation for the British Orders in Council, issued Nov. 11 of the same year and forbidding direct trade by the American colonies with any European country under Napoleon's control. These two decrees practically closed all European ports to American ships. To offset them Congress passed the Non-Intercourse Act, which was in force for about two years, but failed to secure the repeal of the obnoxious decrees.

Milburn, William Henry (1823-1903), an American clergyman, born in Philadelphia and educated at Illinois College. When five he lost the sight of one eye by an accident, finally becoming totally blind. In 1843 he was ordained a Methodist preacher. He had circuits in Illinois and various Southern States; later, for a time, he was deacon in the Episcopal Church but returned to the Methodists in 1871. He was chaplain of each house of Congress several times. In the interest of his work he traveled some 1,500,000 miles in America and Europe and lectured and wrote extensively. He was known as the "Blind Man Eloquent."

Mil'dew, popularly a name given to any mold which attacks plants or any animal or vegetable matter; scientifically, a mildew is a plant disease caused by a certain family of fungi and easily distinguished by the cobwebby network which it forms upon the leaves. It is sometimes parasitic, living upon growing plants, and sometimes saprophytic, living upon dead organic matter. The most common is that familiarly seen upon the leaves of the lilac. It appears first as a small gray-white patch, which soon changes to yellow, brown and then black. This or a similar mildew attacks a variety of plants: trees, like the maple,

elm, beech, oak and basswood; shrubs, like the willow, huckleberry, hawthorn and gooseberry; vines, like the grape, Virginia creeper and hop; and herbs, like the dandelion, cocklebur and almost all weeds. Cherries and plums sometimes suffer from an allied fungus disease. Mildews are not especially troublesome except upon fruit-bearing plants, and there they are easily checked by care and attention. Consult Massee, *A Text-Book of Plant Diseases;* United States Department of Agriculture, *Bulletin 11;* Marshall Ward, *Diseases of Plants.* See BLIGHT; FUNGICIDE; INSECTICIDE.



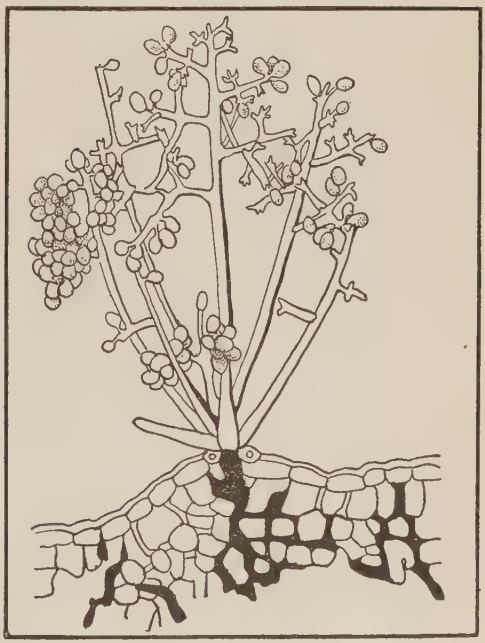
POWDERY MILDEW OF ROSES

Mile. See WEIGHTS AND MEASURES.

Miles, Nelson Appleton (1839-), an American soldier, born in Westminster, Mass. He engaged in mercantile business in Boston until the opening of the Civil War, when he entered the Federal army as a volunteer, and in October, 1865, was promoted major-general. After the war he conducted a number of campaigns against the Western Indians. In 1895 he entered into full command of the United States army, and held that position during the war against Spain. As lieutenant-general he was retired in 1903. Two years later, however, he was appointed temporary commandant of the Massachusetts militia, on the governor's staff. At various times General Miles represented the army at the seat of war between Turkey and Greece and at Queen Victoria's Diamond Jubilee. He has written much for magazines, and there have recently appeared his memoirs of civil and military life, under the title *Serving the Republic.*

Mil'ford, Mass., a town of Worcester Co., 18 m. s.e. of Worcester, on the Charles River and on the Boston & Albany and the New York, New Haven & Hartford railroads. Milford is noted as a manufacturing center, the products including straw goods, silk, boots and shoes, machinery, needles, thread, boot- and shoe-trees and bone cutters. The granite quarries in the vicinity contribute largely to the industrial wealth of the town. There is a high-school building and a memorial hall. Milford was settled in 1669 as a part of Mendon but was incorporated as a separate town in 1780. Population in 1920, 13,471.

Military Academy, United States, a school for the education of officers for the United States army. This academy is beautifully situated at West Point,



DOWNY MILDEW OF GRAPE

N. Y., on the west bank of the Hudson River, about 50 m. north of New York City. It occupies 2300 acres of a plateau 180 ft. in elevation, surrounded by

hills from 500 to 1500 ft. high. It was founded in 1802; its power and capacity were increased in 1808; and in 1903, $5,500,000 was appropriated for its extension, making it one of the finest institutions of its kind in the world.

The students are called cadets and are recruited as follows: one from every congressional district, one from each territory, one from the District of Columbia, one from Porto Rico, two from each state at large and 40 from the United States at large. Each of these must be a resident of the district or state from which he comes. The selection of cadets is made by holding a competitive examination on the first of May in the region where a vacancy has occurred. Those who pass the examinations in English, geography, American history and elements of mathematics, and who stand a severe physical test, form the body from which recommendations are made by Congress to the president, who appoints as many as may be required to fill vacancies.

The course of study requires four years. The cadet has $500 a year and one ration a day. He is not allowed to receive money or provisions from outside. He has a furlough after two years, which is the only time during his course that he gets out into the world. He graduates a second lieutenant in the regular army and must serve eight years.

The academy is under a superintendent, who is an army officer; and there are about 80 instructors, who are also army officers, those of them who teach military science and tactics being detailed every four years by the secretary of war. Classes are composed of about ten cadets, who are required to recite every day in each branch pursued. The instruction is very thorough, and the ideals of life are high.

Militia, *Mi lish' a,* ordinarily a body of citizens armed and trained for military services, but not engaged in such service except in case of emergency. In its broadest application the term includes all able-bodied male citizens of a country between specified ages. In Great Britain the organized militia constitutes the second line of the army. In the United States all able-bodied citizens between the ages of 18 and 45 are included in the militia, numbering over 15,000,000.

In the United States the militia is divided into two classes, the organized, known as the National Guard, and the reserve. The National Guard is organized under the governments of the states, each of which maintains one or more regiments. The instruction, drill and plan of organization are the same as those in the regular army. The National Guard can be called out by the governor of the state to suppress riots and maintain order within the state. They are also subject to the call of the president whenever he considers that conditions make the call necessary. When called out by the president, the National Guard becomes a part of the regular army, and the troops remain in the service for the term specified in the call, unless relieved by the president. In 1912 there were in the National Guard 9437 officers and 122,377 men. See ARMY, UNITED STATES.

Milk, the white fluid secreted by females of Mammals for the nourishment of the young. For commercial purposes that produced by cows, goats, sheep and asses is made use of in many countries, although only that of cows is used to any extent in the United States. Milk is a watery liquid containing many tiny globules of fat, which, being lighter than the liquid in which they are borne, rise to the surface and constitute the cream; with them rise the proteids, casein and albumin which are contained in fresh milk. Although at the proper temperature the cream will rise in a few hours' time, the process may be hastened by means of a cream separator, or centrifuge (See CREAM SEPARATOR). Every 100 lb. of good milk contains 87 lb. of water, 4 lb. of fat, 1⅓ lb. of casein and albumin and 5 lb. of milk sugar. It requires 5½ gallons of milk to produce a gallon of cream, 1⅓ gallons to make a pound of cheese, and 3½ gallons to make a pound of butter.

If milk is allowed to stand at a temperature above 45° F., it will sour within 24 hours; the souring is a process of fermentation caused by a bacterium, or tiny plant, which enters from the air and the dust of house or barn, and in the course of its growth changes the milk sugar to lactic acid. When seven-tenths of one per cent of the milk has become acid, the milk coagulates and is said to be sour. Since these bacteria are present in all dust and impurities, all milk containers must be kept scrupulously clean, or, since the bacteria grow very slowly at low temperatures, milk kept below 40° F. seldom sours before it is used. Milk may be sterilized, that is, the bacteria in it may be destroyed, by keeping the milk at the boiling point for some time. This, however, also changes other properties of the milk and decreases its value, so the process generally employed is pasteurization, named after the great investigator of bacteria, Louis Pasteur. Pasteurization is accomplished by heating milk to a temperature of 140° F. for 20 minutes or to a higher temperature for a shorter period and then quickly cooling it. The addition of chemicals to prevent souring of milk is prohibited in most states of the United States, since chemicals decrease the digestibility of the milk and often affect the health of persons, especially infants, drinking it.

Milk from diseased animals should never be used unless properly sterilized, and as milk readily absorbs germs of contagious diseases, especially typhoid fever and scarlet fever, there is great danger in the spread of disease by milk not properly cared for; barns, dairies, cattle and dishes must be kept absolutely clean, and milk that is to be shipped any distance should be shipped in cars where the temperature may be kept below 40° F.

The products of milk are condensed milk and cream, malted milk, butter, cheese and, less commonly, a hard substance known as milk stone, which is used as a substitute for celluloid and ivory. There is an average of 7,728,600,000 gallons of milk produced in the United States annually. See Dairy Husbandry; Butter; Cheese.

Condensed Milk. Condensed milk is prepared by evaporating milk until about three-fourths of the water is expelled. The process is carried on in factories, to which large quantities of milk are delivered. From the storage tanks the milk is run into copper vessels holding about 1000 gallons, which is brought to a boiling point by steam heat. It is then strained and run into another vessel, called the sugar mixer, where the proper quantity of granulated sugar to preserve it is added. The milk is then placed in vacuum pans, where the evaporation is completed at a low temperature, about 140°. The condensed milk is then drawn off and placed in tin cans, which are sealed air-tight. Condensed milk has the consistency of cream, for which it is extensively used as a substitute, by camping parties, and in localities where milk is not easily obtained.

Milk Snake, or **Chicken Snake,** a harmless snake of the Colubrine Family, common in the United States from Iowa, north and east. Its general color is gray spotted with chestnut; its length is from two to three feet. It has received its popular names because it was supposed to feed upon milk and steal it from the dairy cans. Its chief food, however, consists of mice and other small Rodents. Milk snakes are tamable and are said to make amiable pets.

Milk Tester, an apparatus designed to test the amount of butter fat in milk. The Babcock tester, which was the first successful tester and is the one commonly in use at present, makes use of the fact that the proteids, which under ordinary conditions have a great affinity for butter fat, may be removed from the milk by means of sulphuric acid. This leaves the butter fat free in a watery liquid, from which it readily separates. The Babcock tester consists of a number of radiating arms set in a revolving spindle; at the end of each arm is a graduated test tube, into which the

proper proportions of milk and sulphuric acid are introduced. At the rapid revolutions of the spindle the cream is separated from the milk, and the sulphuric acid combines with the proteids. The amount of the butter fat may then be "read" from the graduations. This tester is universally used in dairies and creameries and enables even an amateur to make reliable tests. See CREAM SEPARATOR.

Milk Tree. See COW TREE.

Milk'weed", a name given to a large number of plants of the Milkweed Family, all characterized by having a thick, milky juice and odd, irregular flowers.

MILKWEED

In general, the milkweeds are low, roadside or field weeds having ordinary foliage, generally linear or oblong in form. The stems are erect and frequently hollow, often, too, covered with soft, downy hairs. The flowers may be bright orange, red, pink, magenta, greenish, white, yellow or purple in color, but are outwardly very unlike. They grow in umbrellalike or flat-top clusters, and each individual blossom has a little green calyx, with five pointed lobes bent back abruptly. The corolla is also five-lobed. The fruit is a double pod in which each seed has a long tuft of soft, silky down at the end. To this class belong the butterfly weed, or pleurisy root, swamp milkweed, four-leaved milkweed, and the common milkweed whose soft down is seen floating through the air in autumn and whose prickly, swollen pods are very artistic as they hang on the withered stalks.

Other milkweeds have twining stems and often a flat crown, or corona, covering both calyx and corolla. In this class are the wax plant, a cultivated weed and some dooryard varieties. The cactuslike milkweeds are low plants, cultivated in greenhouses as curiosities. The commonest of this class is the hairy stapelia, a native of South Africa.

The milkweeds are all alike in having the tops of the stamens peculiarly connected with the pistil, and the pollen adhering to them in sticky masses instead of scattering in a fine dust as does that of most plants. The plants are found as weeds in all parts of the United States and Canada.

Milky Way, or **Gal'axy,** a band of whitish light of irregular form, making a complete girdle of the celestial sphere. Under the telescope the Milky Way is seen to be composed of innumerable stars of small magnitude, perhaps because of enormous distance, so closely clustered in many places as to be countless. In one part are two decided branches which reunite. Some parts are full of dark places, among which, one in the South Polar regions, long called by sailors the "coal sack," is notable. Many theories have been advanced to account for the Milky Way, but no one of them has proven wholly satisfactory. See PLEIADES; STARS; CELESTIAL SPHERE; TELESCOPE.

Mill, John Stuart (1806-1873), an English scholar and author, recognized by his countrymen as the foremost philosopher and political economist of the time. He was born in London, and was educated under his father's direction. At 15 he spent a year in France; but he had already gained an extraordinary knowledge of Latin, Greek, mathematics, history and science. At 17 he became a clerk under the East India Company, retiring 35 years later from an important position with a pension of £1500, when India was transferred to the British Government. After 1858 he gave all his time to authorship and public service, which had long claimed his interest and part of his time. He became a member of Parliament in 1865, acting with the advanced Radicals.

Mill may be regarded as the final exponent of the empirical and utilitarian school of philosophy which began with John Locke, and his influence on English thought in the 19th century was very great. "How to unite the greatest individual liberty of action with a common ownership in the raw material of the globe and an equal participation of all in the benefits of combined labor"—seemed to him the problem of the future. His chief works are *A System of Logic* and *Principles of Political Economy.* Among other writings are *The Subjection of Women, Three Essays on Religion* and *Thoughts on Parliamentary Reform.*

Millais, *Mil la',* **Sir John Everett** (1829-1896), an English painter, born at Southampton, of an old Jersey family of Norman descent. In 1848, together with William Holman Hunt, he initiated the Pre-Raphaelite movement. Their aim was to return to the simplicity of the early Italian painters, and to present on canvas what they saw in nature. The first work of Millais as an exponent of the new art elicited severe abuse, and he was championed by Ruskin. His themes were highly imaginative and showed refined conception and beautiful execution. He illustrated among other subjects Trollope's novels and *Tennyson's Poems,* and in 1863 was elected to membership in the Royal Academy, later succeeding Lord Leighton as president. His last 25 years were devoted to painting portraits and nature and the world about him. Among his most splendid canvases are *A Yeoman of the Guard,* excellent for color; and *The Northwest Passage,* remarkable for its broad treatment of a descriptive subject, splendid draughtsmanship and compelling interest.

Miller, Cincinnatus Heine (1841-1913), better known as Joaquin Miller, an American poet, born in the Wabash District, Ind. With his parents he moved to Oregon in 1854, became a miner in California, lived among the Indians of the Pacific coast, and turned from law to journalism, serving as editor of the Eugene (Ore.) *Democratic Register.* His early poems were unrecognized in America, but upon his going to England he soon became the "lion" of London society for a short time. On his return to America he continued his journalistic work in New York City, Washington, D. C., and Oakland, Cal. His poetry is highly romantic and full of tropical passion; it is brilliant at times, but is never marked by distinct artistic excellence. He wrote *Songs of the Sierras, Songs of Italy, Building of the City Beautiful* and *The Danites in the Sierras,* a novel.

Miller, Hugh (1802-1856), a noted Scottish author and geologist, born in Cromarty. He was a journeyman mason in various parts of Scotland, and in 1829 published his first volume of poems. His study of geology was fruitful and he wrote freely, both literary and scientific essays. Among his writings are *Poems Written in the Leisure Hours, The Old Red Sandstone, Footprints of the Creator* and *Testimony of the Rocks.*

Mil'let, a species of grain of the Grass Family raised in Eastern countries as a forage plant. It produces sprays of flowers which are succeeded by roundish seeds used as food for poultry. Many species are raised in the United States but not to any great extent. Rus-

sia and Japan lead in the production of millet, and in those countries it is used both as food and forage. See KAFIR CORN.

Millet, Francis Davis (1846-1912), an American painter and writer, born at Mattapoisett, Mass., and educated at Harvard. He served in the Civil War as a drummer and assistant surgeon. In 1871 he began his European studies at the Royal Academy of Fine Arts at Antwerp, and also studied in France and Italy. He served as war correspondent for the New York *Herald* and the London *Daily News* during the Russo-Turkish War of 1877-78, and represented the London *Times* and *Harper's Weekly* in the Philippines during the Spanish-American War. As an artist, he is best known as a painter of subjects of everyday life representing 18th-century England. His pictures treating of classic Greek and Roman subjects are also notable. Millet was actively identified with the organization of the American Academy at Rome and was a member of the National Academy of Design. He lost his life in the *Titanic* disaster of 1912. His chief paintings include *At the Inn, A Cosy Corner, Between Two Fires,* a decoration in the Minnesota State Capitol, and portraits of his wife and President Butler of Columbia University.

Millet, *Me" leh',* **Jean François** (1814-1875), a celebrated French painter, born in the hamlet of Gruchy into a poor peasant family. After dire struggles with poverty, he was enabled to study at the School of Fine Arts, Paris; but the rigid, classical style which prevailed there was distasteful to him, and he retired to Gruchy. His *Milkwoman* and *Lesson in Riding* were exhibited at the Salon in 1844. Subsequent exhibitions excited adverse criticism; but in 1848, relieved from immediate want by the sale of his *Winnower* and further assistance, he was enabled to leave Paris, to which city he had recently returned, and settle at Barbizon. Here, in company with Rousseau, he labored the remainder of his life, and here his best work was done. Among Millet's greatest canvases are *The Potato Planters, The Gleaners* and *The Angelus.*

Millipede, *Mil' li peed,* or **Thousand-Legged Worm,** a family of harmless but generally disliked animals of the group known as Ceratophora, which also includes the centipedes. The millipede has a long, cylindrical body having a horny covering and divided into numerous segments. Each segment has two pairs of legs which are set very close together. The number of the segments and the consequent number of legs have given it its popular name, although there are far from 1000 legs. The millipede moves slowly in spite of its numerous legs, and feeds only upon vegetable matter. It has not, as was once supposed, dangerous poison fangs. See CENTIPEDE.

Mill Springs, Battle of, an engagement of the Civil War, fought Jan. 19, 1862, at Mill Springs, on the Tennessee River, in Kentucky, between 4000 Federals under General Thomas, and an equal number of Confederates under Gen. George B. Crittenden. The Federals opened the battle, which lasted all day, and by nightfall the Confederates were defeated and retreating toward Nashville. A National cemetery marks the battlefield of Mill Springs, or of Fishing Creek, as it was also called.

Millville, N. J., a city of Cumberland Co., 40 m. s.e. of Philadelphia, on the Maurice River, at the head of deep-water navigation, and on the Pennsylvania Railroad. The town has a large public park at Union Lake, a small but attractive sheet of water. Millville is an important manufacturing center and has extensive iron foundries, glass factories, shirt-waist factories, cotton mills and bleach and dye works. It is also a shipping center for fish and produce. The town was incorporated in 1801 and chartered as a city in 1886. Population in 1920, 14,691.

Mil'ner, Alfred Milner, VISCOUNT (1854-), an English statesman, born at Bonn, Germany. After completing his education he engaged in journalism. His public career began with his service as private secretary to

the chancellor of the exchequer (1887-89). This was followed by his appointment as undersecretary of finance in Egypt. In 1897 he became high commissioner of South Africa and governor of the Cape of Good Hope, and in 1901, governor of the Transvaal and Orange River colonies. He returned to England in 1905, and in later years advocated tariff reform and colonial preference. Lord Milner was subjected to severe criticism in Liberal circles as being partly responsible for the Boer War, but was honored by others as having laid the foundation upon which "a united South Africa would arise to become one of the states of the empire."

Miltiades, *Mil ti' a deez,* a famous general of Athens, born in the latter part of the sixth century B. C. He became the ruler of the Chersonesus and led a successful expedition against the Scythians. When the Persians invaded Greece in 490 B. C. he commanded the Athenian force, and by his masterly strategy won the Battle of Marathon. The next year he led a fleet of 70 ships in an unsuccessful expedition against Paros, where he was wounded. On his return he was overthrown by the Democracy and condemned to pay a heavy fine. See MARATHON, BATTLE OF.

Mil'ton, John (1608-1674), one of the greatest of English poets, born in London. His life covers the period of the Puritan movement of the 17th century, by which he was strongly influenced and of which he was probably the best single representative. Indeed this movement in its three stages determined the main outlines of his life and the phases of his literary activity. His father was a notary public of some means who had been converted to Puritanism, but of the earlier and freer type, before its narrowness had developed. The son grew up in an atmosphere of music, literature and the social graces, mingled with sincere piety. Entering Cambridge at the age of 17, he remained for seven years, taking his master's degree in 1632. Here he wrote much Latin verse and the magnificent ode *On the Morning of Christ's Nativity.*

Retiring after graduation to his father's home at Groton, he spent six years more in the study of the classics, poetry and music, as well as mathematics, French and Italian. He had early decided to be a poet, and these days of quiet study, meditation and joyous communion with nature formed no small part of his preparation. Sweet and chivalric Spenser was his favorite poet, and all the early fruitage of the Renaissance his rich inheritance. In this idyllic atmosphere he wrote *L'Allegro, Il Penseroso, Comus* and *Lycidas,* among the greatest lyrics in the English language, characterized by a purity, grace and artistic finish that were the natural expression of Milton's fresh and beauty-loving soul.

In 1638, after the death of his mother, Milton spent two years in travel and study on the Continent, where he met many prominent men, among them Grotius and Galileo. The Civil War called him home in 1639. Puritanism had now entered its period of armed conflict for reform. For nearly 20 years Milton threw himself into the struggle for justice and freedom with unstinted devotion, using the pen as effectively as others were wielding the sword. It is the period of his controversial prose writings, with almost no poetical production. His pamphlets on divorce, due probably to his own unhappy marriage, were followed by the *Areopagitica,* a noble plea for liberty of thought and speech. Upon the execution of the King he was the first writer to come to the defense of Parliament in the pamphlet *On the Tenure of Kings and Magistrates.* It was probably this that led to his appointment as Latin secretary of the Commonwealth, in which office for the next ten years he conducted the correspondence with foreign powers and answered the pamphlets written against the government. In the midst of these duties he became totally blind; but continued his work, with Andrew Marvell as his assistant, until 1659. On the return of Charles II in 1660, Milton's books were burned by the public hangman and he narrowly escaped paying with his life

for his devotion to the cause of the Commonwealth.

Milton now returned to his long cherished purpose of undertaking a poetical production that should have a permanent place in literature. As early as 1642 he had chosen for his subject the fall of Adam. During the succeeding 16 years of strenuous conflict this theme was revolving in his mind and taking shape, until it developed into the vast drama of creation, with the entire universe as a stage, presented in *Paradise Lost.* His preparation for his task was at last complete. In his own life he personifies the disappointed hopes of Puritanism. Mingled with his disappointment, however, there is the deep conviction that the spirit of Puritanism will finally triumph. This situation, while it robs Milton's style of the airy grace and charm of his early poetry, has developed the lofty grandeur and sublimity of style best fitted for the subject matter of his great epic. The effect is enhanced by his choice of blank verse, the most severe of English measures; and by his long and involved sentences which hold the meaning in suspense until "it falls upon the mind like the combing mass of a breaker on the shore." For daring imagination, vastness of conception, wealth of illustration, sustained grandeur of thought and sublimity of expression, *Paradise Lost* is probably without an equal in any language.

Paradise Lost was finished in 1665 and published in 1667. Four years later appeared a volume containing *Paradise Regained,* whose subject matter is indicated by its title, and *Samson Agonistes.* The latter was a new venture for Milton in the field of poetry, and shows his genius at its maturest. The subject, moreover, was one which his own experience, private and public, fitted him to develop. It has been called the most successful tragedy of the Greek type ever written by an English poet. Milton's many-sided and strenuous life came to an end three years after the publication of his last volume of poems, and he was buried in St. Giles's, Cripplegate, beside his father. His writings, and especially *Paradise Lost,* his great masterpiece, have won for him a foremost place in English literature, second only to that of Shakespeare; while the moral beauty of his character and the patriotic and tragic devotion of his life command universal admiration and respect for him as a man. See CROMWELL, OLIVER.

Milwaukee, Wis., the metropolis of the state, is located on Lake Michigan, 85 m. n. of Chicago, at the confluence of three rivers which flow into a bay vying in beauty with the famous Bay of Naples. The outer harbor, with its 2 m. of breakwater, constitutes a fine harbor of refuge. The inner harbor has 30 m. of dockage and is considered the best on the lakes. The largest lake steamers can unload their cargoes in the very heart of the city. The rivers, which divide the city into three parts, are spanned by numerous bascule bridges and viaducts.

PARKS AND BOULEVARDS. Over 1000 acres are devoted to park purposes. Lake, Juneau and Riverside parks are on the East Side; Kosciusko, Mitchell and Humboldt parks on the South Side; and Sherman, Highland and Washington parks on the West Side. Of these, Lake Park, with its numerous ravines, tributary to Lake Michigan, is the most beautiful. Washington Park contains a large zoological garden, and Mitchell Park is celebrated for its conservatory, containing a large collection of rare plants and flowers. Juneau Park was so named in honor of Solomon Juneau, the founder of the city. Grand Avenue, Prospect Avenue and Lake Drive are some of the most beautiful residence streets in the world.

PUBLIC BUILDINGS. The principal public buildings are the Federal Building, containing the post office, headquarters for the United States courts in Wisconsin, the custom-house and the weather bureau; the Milwaukee Public Library and Museum, containing 231,096 volumes and 325,257 specimens of every description; and the Layton Art Gallery, containing one of the best col-

lections of paintings in the United States. The Auditorium, with a seating capacity of 8000 in its main hall and 4000 in the smaller halls, is a semipublic building, having been erected partly by private subscription and partly by public taxation. There are many modern business structures, over 100 hotels and 189 churches in the city. Milwaukee is the seat of a Roman Catholic bishop and a Protestant Episcopal bishop. Milwaukee is essentially a city of homes, the percentage of laboring people owning their homes exceeding that of any other large city in the Union. Its street-railway system is unsurpassed. Interurban lines connect the city with Port Washington and Sheboygan on the north, Waukesha, Oconomowoc and Watertown on the west, and Racine, Kenosha and Chicago on the south.

Educational Institutions. There are 67 public elementary schools in which the regular subjects, manual training and domestic science are offered, and six large high schools. Among the special features of the school system are social and recreational centers, medical and dental inspection, vocational evening classes, ungraded classes, the period set aside each day for special help, open-air schools, and classes for exceptional children, for stammerers and for the blind and the deaf. The last named, upon completing the course in the elementary schools, enter the high schools and work side by side with the seeing and hearing children. There are also large, well-equipped schools of trades for boys and girls, the first schools of the kind to be opened in the United States. There are 61 parochial and 17 nonsectarian private schools. The children of the private and parochial schools receive instruction in manual training and domestic economy in the public schools.

Among the higher institutions of learning may be mentioned Marquette University (Catholic), including among other departments medical, dental and law schools; Concordia College (Lutheran); Milwaukee-Downer College (for girls); the Milwaukee State Normal School; the National German-American Teachers' Seminary; the Wisconsin College of Physicians and Surgeons; the Wisconsin Academy of Music; and seven commercial colleges.

Population and Health. Milwaukee covers an area of 24 sq. m. and has a population of over 400,000. Surrounding the city are many suburbs, which are practically a part of the city. About half of the people are of German descent. The proportion of illiterates is very small and the percentage of crime and vice is very low. Milwaukee is a healthful city, its annual death rate being only 12 per 1000. Its climate is tempered by Lake Michigan. Its excellent sewerage system extends to all parts of the city. The drinking water is drawn from Lake Michigan. The water-supply system, representing an investment of over $5,000,000, is owned and operated by the city. There are two flushing tunnels connecting the rivers with Lake Michigan, by means of which the rivers are flushed with fresh water once every day.

Industries and Commerce. The manufacturing districts are found on the river "flats" and along the belt lines of the railroads extending around the city. The principal business sections are in the valleys above the "flats." Having both rail and water transportation facilities, Milwaukee has become one of the largest collecting and distributing centers in the United States for coal and grain, and for flour, lumber and many other manufacturing products. Shipments are made by means of the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Soo, the Grand Trunk and the Pere Marquette railways, and some 15 lines of lake steamers. The Pere Marquette Railway connects with its main line at Ludington, Mich., and the Grand Trunk with its main line at Grand Haven, Mich., by means of railway ferries and break-bulk boats. The favorable commercial location of the city, the cheap coal rates, the short distance from iron mines, lumber regions, the grain fields of the Northwest, and many

other raw materials, and the skillful, industrious labor constituency,—all combine in making Milwaukee one of the largest manufacturing centers in the United States. It has the largest tanneries, formerly the largest breweries, and now the largest machinery-construction shop in the world. The leading manufactured products are as follows: leather and leather products, iron and steel goods and heavy machinery, packed meats, coal products, building material, agricultural implements, distilled and rectified liquors, and electric and telephone supplies. Besides these, there are 39 other industries, each of which has an output valued at from $1,000,000 to $5,000,000, and 43 industries whose output is valued at from $100,000 to $900,000. Milwaukee products are shipped to all parts of the world. The total value of all the manufactured products for 1918 was $741,188,557, and the wholesale jobbing trade amounted to almost a billion.

History. It is supposed that Joliet and Marquette were the first white men to enter the bay in 1673. For the next century the site was frequently visited by French fur traders and by missionaries. In 1763 a fur-trading post was established. In 1795 Jacques Vieau, in the employ of the North-Western Fur Company, established a permanent post here. In 1818 Solomon Juneau began a settlement and is generally considered the founder of the city. Settlements were made on both sides of the river and were known as Milwaukee East Side and Milwaukee West Side. A third settlement on the south side was known as Walker's Point. In 1846 these three villages were united as the city of Milwaukee, of which Juneau was the first mayor. Immigration from Germany began in 1840 and added much to the city's population. The first newspaper was published in 1836, and the first bank was established in 1837. The city was connected with Chicago by telegraph in 1849 and by railway in 1856. Milwaukee's growth has been constant and substantial and the city forms one of the most important ports on the Great Lakes. Population in 1920, 457,147.

Mimeograph, *Mim' e o graf".* See Copying Devices.

Mimicry, *Mim' ik ry,* a superficial resemblance, always external and plainly visible, of one animal to another or to some inanimate object. Such imitation is now considered under two classes. The first, cryptic mimicry, or likeness to the object upon which the imitator usually rests, is frequently spoken of as protective resemblance. It is noticeable in almost all forms of animal life, and is undoubtedly the commonest means of

MIMICRY

protection. The tree toad, which, with its gray, spotted body, resembles the bark of the tree upon which it waits for its prey, changes its color in an hour's time, as the sun mounts higher in the sky and brightens the color of the bark. The green katydid can barely be distinguished from the stalk of grass to which it clings. Members of the Walkingstick Family are so much like twigs, both in form and color, that, though they are fairly common insects, they are rarely noticed. Caterpillars are commonly so colored and shaped as to be rendered inconspicuous, and butterflies are frequently shaded like the flowers which they most affect. The leaf insect in

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PROTECTIVE MIMICRY—INSECTS

1. Butterfly becoming (2) when at rest. 3, 4, 5. Other leaf imitators. 6, 7, 8. Wings completely hiding insects. 9. Pupa-case resembling broken twig. 10. Caterpillar apparently a dead branch. 11. Walking-stick. 12. Bark bug. 13. Female of agreeable tasting butterfly mimicking (14) a nauseous species while male (15) remains unchanged. 16, 17, 18. Beetles imitated by (19) a butterfly. 20, 21. Butterflies resembling ichneumon fly and wasp. 22. Bee-like beetle. 23, 24, 25. Harmless flies protected by likeness to stinging bees and wasps. 26, 27. Imitators of ants. 28. a. Wasp's nest mimicked by (b) cocoon.

shape and color is much like a living leaf. In the insect world examples of protective coloring might easily be multiplied, and it is interesting to discover how many come under one's observation in the course of a short walk through the woods. Among the higher animals, the zebra, whose striped body imitates the sunlight and shadow through the trees, is a well-known example. In the illustration the left-hand figure shows a measuring worm posing as a twig, and the right-hand figure, a walkingstick which closely resembles the branch upon which it rests.

True, or aposematic, mimicry is ordinarily implied in the use of the word *mimicry*. It refers to the wholly external, and never structural, resemblance of an otherwise helpless animal to another which is in some way well armed. A familiar example is found in the robber fly, whose big body and hairy legs so resemble the bumblebee that only close observation will distinguish between them; thus the stingless fly is rendered safe from attack by birds and other animals which have learned that the bee is not defenseless. Other flies resemble wasps. A very curious case of mimicry is that of the monarch butterfly, which bears a pair of unpleasant scent glands extremely offensive to birds. Numerous species of butterflies, notably the viceroy, have adopted a like coloration and so are free from attack.

In every case of mimicry, which has been the subject of especial study, two facts have been found true: the imitator and the imitated inhabit the same general region, and the imitator is, except for its mimicry, almost entirely defenseless. It is generally true also that the female, which is ordinarily less able to escape than the male, is the more accurate in its mimicry. Both protective resemblance and mimicry are supposed to be the result of natural selection. Darwin in his *Origin of Species* discusses these subjects at length, and J. L. Hancock in *Nature Sketches in Temperate America* gives a less technical and very entertaining review of the subject.

Mi'nas Bay, or **Basin of Minas,** the eastern arm of the Bay of Fundy, extending into Nova Scotia for 60 m. The Avon is the chief river falling into it, and on the shores of the bay is the village of Grand Pré, the scene of a part of the story of Longfellow's *Evangeline*.

Mind, as defined by modern psychology, "the sum total of an individual's mental experience." Mind is considered to include one's entire mental powers, as sensation, perception, memory, imagination, thought, reason, feelings and will. These different mental powers are no longer considered as distinct faculties but as modes of mental activity. When the term *mind* is used in distinction with body it means the spiritual entity of man. Psychologists consider the terms *mind* and *soul* to be synonymous. When the term *soul* is used in a religious sense, however, its meaning is usually restricted to those spiritual activities arising from one's relation to a supernatural being.

Mindo'ro, Sea of. See SULU SEA.

Min"eral'ogy, the science of minerals. Mineralogy differs from geology in that it considers each mineral separately and studies its physical and chemical properties. It also considers the origin of the various minerals and their relation to each other. A knowledge of mineralogy is necessary to the geologist in his study of rocks, to the mining engineer in locating metal-bearing rocks and to the metallurgist in extracting metals from their ores (See METALLURGY.)

Many minerals are highly useful in the arts and others are highly prized as gems (See PRECIOUS STONES). A few minerals, notably quartz, feldspar, mica, hornblende, calcite and clay, enter into the composition of many rocks and constitute by far the larger part of the earth's crust. The study of mineralogy enables one to distinguish common minerals at sight, and when this knowledge is gained, one can easily learn to recognize such rocks as granite, marble, porphyry and basalt.

By structure, minerals are classified as

crystalline and massive. Quartz and calcite are excellent examples of crystalline minerals, and clay is a good example of the massive varieties. Two important tests in classifying minerals are crystallization and hardness. The same substance always crystallizes on the same plan (See CRYSTALLOGRAPHY); hence the study of the crystals to determine the plan on which they are formed is very important. The degrees of hardness are

MINERVA

determined by tests and range from one to ten. Beginning with the softest they are as follows: 1, talc, 2, selenite, 3, calcite, 4, fluorite, 5, opalite, 6, feldspar, 7, quartz, 8, topaz, 9, corundum, 10, diamond. Consult J. D. Dana, *System of Mineralogy;* E. S. Dana, *Minerals and How to Study Them.*

Mineral Wool, a material resembling wool in appearance, and produced when molten slag from a blast furnace is subjected to a jet of steam or air under pressure. It is used as a nonconductor of heat for covering boilers and steam pipes. See BLAST FURNACE; SLAG.

Miner'va (in Greek, Athene), in classical myths, goddess of skill and wisdom, of all the liberal arts and sciences, useful and ornamental, for both men and women, was the daughter of Jupiter and Metis. A short time before her birth her father swallowed her mother; thus it happened that she sprang from her father's brain full-grown and dressed in armor. As patroness of arts and industries, Minerva superintended the construction of the wooden horse and of the Argo. As an expert weaver she not only made robes for herself, Juno and many divinities and heroes, but instructed favored mortals. Being an advocate of scientific and defensive warfare, a direct contrast to Mars, she protected cautious warriors. Of these, Ulysses was her favorite. Minerva is said to have invented the flute and to have thrown it aside in disgust because Cupid laughed at her puffed cheeks as she was playing. In a contest as to who could produce the most valuable gift for man, Minerva, on furnishing the olive, was awarded the prize, which was the city called Athens in her honor. Here the gorgeous Panathenæa was celebrated for her.

The olive was Minerva's choice plant; the serpent and owl were her favorite pets. Often she was represented in gilt helmet, carrying her shield, in the center of which was the Gorgon's head. She appeared, too, in the peaceful garb of a Grecian matron.

Min'ing, the process by which commercial minerals are taken from their natural position in the earth and made available for shipment. All useful metals and their ores and many nonmetallic substances, such as coal, building stone, natural fertilizers and salt ore, are obtained by mining. However, other terms may be used in describing the various processes of separating these substances from

their natural position. The term *mining* is generally employed to denote the means by which the substances like ores are obtained from the earth, while those processes which have to do with separating the metals from their ores are included in the art of metallurgy. See METALLURGY.

Mining has been practiced for thousands of years. It is referred to in the 28th chapter of *Job*, and the working of a gold mine is described and illustrated in an Egyptian papyrus drawn in 1400 B.C., and now preserved in the museum at Turin. Minerals procured by mining may be divided according to their formation into three classes: those occurring in the form of beds or layers beneath the surface; those occurring in veins or seams in rocks; and those found upon the surface of the earth. Deposits in beds usually include such bodies of useful materials as iron and coal, which often lie in beds generally parallel to layers of rock and copper deposits which are scattered through stratified rocks, as in the beds of copper ore in the Lake Superior region. Veins or seams are fillings of cracks or fissures in the rock, and are often known as "lodes" if the mineral is valuable (See VEINS). Veins differ from bedded deposits in being less continuous, more irregular and without any relation to the form of the rock. Vein deposits, as well as those in beds, may be horizontal, vertical or inclined to various angles. Surface deposits generally consist of gravel, sand or earthy matter containing some valuable mineral like gold, as those in Alaska and other places in the Rocky Mountains. Tin ore is found also in gravel and sand.

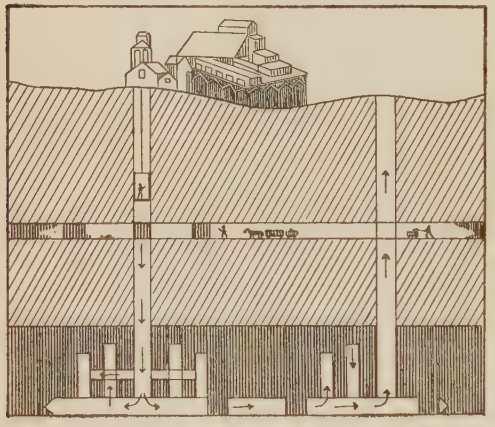
EXPLORATION. Before a mine is opened it is usually explored or tested to determine the extent and value of the deposits. The methods employed depend largely upon the conditions confronting the operators. If the ore is near the surface, shallow pits may be dug at various places, or the overlying rock and soil may be stripped off a considerable area. The modern method, however, for exploring deep deposits is by boring, using apparatus similar to that employed in boring wells, except that a diamond drill takes the place of the ordinary drill; the core formed by the drill gives an exact representation of the depth and character of the deposit. See WELL BORING.

METHODS. Mining may be divided into two classes: (a) surface mining, or "openwork," and (b) underground mining. In openwork mining may be included gold placer mining in which the ore is separated from the sand and gravel by causing water to flow in a continuous stream over the gravel and sand. The lighter materials are washed away, leaving the gold behind. Openwork of another character is employed in mining iron in the Mesaba Range in Minnesota, where the ore is covered only by a sort of rotten stone which may often be stripped off by steam shovels. This ore is soft and friable, and easily handled by steam shovels (See IRON AND STEEL), but when it is hard it is blasted by dynamite and taken out in masses. In underground mining the cheapest, best and easiest method is by tunnels, provided the ore body lies in the side of a mountain or hill, for if the ore can be conveyed horizontally out of a tunnel, it is cheaper than hoisting the material through a shaft. By having a tunnel on a slight incline, the drainage is improved, and by this means sometimes the expense of pumping out the water is saved. When it is necessary to approach the ore by a shaft, it may be vertical or inclined, as is best suited to the conditions. In small mines this shaft may be only four feet square, but it should be sufficiently large to permit the working of at least two hoists, with cages or skips. There should also be room for pipes and means for ventilation, and carrying down water, etc.

When the material lies in a horizontal bed, like coal, the shaft is sunk to a point a little below it, and levels or crosscuts in the form of tunnels or galleries are made, leading from the shaft into the material to be mined. As the material is worked, it is hauled to the shaft, and by means of a hoisting engine the skip or cage is hoisted up to the surface. The

shaft in the Calumet and Hecla copper mine, Calumet, Mich., exceeds 5000 ft. in depth. Before the introduction of the rock drill (See PNEUMATIC TOOLS) and blasting, mining was a slow operation, particularly when mining through hard rock, like quartz, in which gold is found. The miners in ancient times used wedges of dry wood, which after being inserted in the crevices of the rocks were wetted, which made them swell and force the rock asunder.

COAL MINING. As coal is easily mined, various methods are employed. Drills operated by compressed air or steam may be used to drill small holes, which are filled with gunpowder. This explosive, set off by an electrical current, removes



COAL MINE

large masses from their natural position. Various cutting machines are used, operated either by compressed air or electricity. One form consists of an endless chain on which are placed cutting knives that are made to travel around a frame, and when brought in contact with the coal, cut a groove into it, generally at the bottom, making an undercut. As the coal is removed by further cutting or blasting, the roof of the mine is supported either by leaving pillars of coal at frequent and measured intervals or by the use of suitable timbers. In a mine free from obstructions, the arrangement of levels, crosscuts and galleries is like the streets and alleyways of a city. In deep mines the shaft usually passes through several layers or levels of coal, each of which communicates with the shaft by means of doors.

Coal mines need to be carefully arranged, so that they may be thoroughly ventilated, because of the formation of dangerous explosive gases (See FIRE DAMP). In shallow mines the ventilation may be made by means of an air shaft heated below, but in mines of any great depth, large fans, driven either by steam or electricity, are employed. These may be located at the foot of the shaft and exhaust the air and blow it out of the mine, or may be located on the surface and blow a sufficient amount of fresh air down into the mine. See HEATING AND VENTILATION.

Min'ister - Plen"ipoten'tiary. See DIPLO'MACY.

Mink, a lively little fur-bearing animal of the Weasel Family, equally at home upon land or in the water. It is small, with a slender body, webbed feet and a tail about one-third the length of the body. It may be found in almost any part of the United States and is often seen dodging in and out along the banks of small streams looking for frogs and lizards, or scampering across fields where field mice and other Rodents abound. The mink is easily trapped and the pelt is a source of income to many a farmer's lad. The fur of the Northern species alone is particularly valuable, and especially when secured early in the winter before the coat has been torn by jagged rocks or dense barrier thickets.

Min"neap'olis, Minn., the largest city of the state and the county seat of Hennepin Co., is situated on both banks of the Mississippi River, 420 m. n.w. of Chicago and 581 m. n. of St. Louis, and on the Great Northern, the Northern Pacific, the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Burlington, the Minneapolis, St. Paul & Sault Ste. Marie, the Minneapolis & St. Louis and other railroads. There are three passenger stations within the city limits—the Union Depot and the stations

of the Chicago, Milwaukee & St. Paul and of the Minneapolis & St. Louis railroads. The city occupies an approximately level site, with ranges of low hills on the northeast and the southwest. The Mississippi divides the city into two unequal parts, known respectively as the Eastern Division and the Western Division, the latter being much the larger. St. Anthony's Falls, in the heart of the city, once formed a beautiful cascade, but the construction of a dam across the river at this point has greatly changed their appearance. Below the falls the river flows through a deep gorge, which adds to the beauty of the scenery. Within the city limits the Mississippi is spanned by 21 bridges about equally divided between railways and highways.

Streets. The city is regularly laid out, and most of the streets cross at right angles. The streets are broad and in the residential sections are ornamented with shade trees. The streets running east and west are designated as avenues and those running north and south as streets. The river is the dividing line for streets running north and south, and in the Western Division, Hennepin Avenue as far as Kenwood Boulevard is the dividing line for streets running east and west; and in the Eastern Division, Central Avenue and Division Street form the dividing line. Both streets and avenues are numbered consecutively from the street forming the dividing line. The avenues north of this line are designated as *north* and those south of it as *south*. The building numbers are on the plan of 100 to the block, so that each block begins with another hundred, regardless of the last number in the preceding block. By this system any point in the city is readily found.

Hennepin and Nicollet avenues and First and Second avenues south are the principal streets of the retail district. The wholesale and manufacturing districts extend along both banks of the river from Riverside Park northward to the city limits. An excellent street-railway system, including all the lines of Minneapolis and St. Paul, reaches all parts of the city and has four interurban lines to St. Paul.

Parks and Boulevards. Minneapolis has an elaborate system of beautiful parks and parkways embracing an area of about 3953 acres, with connecting parkways and drives about 55 m. in length. The system begins with Loring Park, a beautiful tract near the center of population, whence it extends through a parkway to a chain of lakes in the southwestern part of the city. These lakes include Cedar Lake, Lake of the Isles, Lake Calhoun and Lake Harriet, each a gem of clear water with a beautiful setting. The parkway extends around three of these lakes, following the shore line. From Lake Harriet it follows Minnehaha Creek to Minnehaha Falls, a beautiful cascade about 50 ft. high and made famous by Longfellow's *Hiawatha*. Minnehaha Park has an area of 142 acres and on the south joins the grounds of the Minnesota State Soldiers' Home. A parkway extends along the bluff of the Mississippi from Minnehaha to Riverside Park. On the opposite side of the river a boulevard leads to the beautiful campus of the University of Minnesota. A short distance below the soldiers' home is Ft. Snelling, a United States military reservation. There are a number of parks which are connected with the boulevard system, chief among which are Glenwood and Powderhorn in the Western Division and Columbia in the Eastern Division.

Buildings. The most important public building is the courthouse and city hall, a granite structure occupying an entire block and erected at a cost of over $3,000,000. The building was erected conjointly by the city and county. The Auditorium on Nicollet Avenue and Eleventh Street, with a seating capacity of 2500, is one of the most excellent and beautiful buildings of its kind in the country. Among other buildings of note are the National Guard Armory and Coliseum, Masonic Temple, the Chamber of Commerce, the Lumber Exchange, the Metropolitan Life Building, the New

York Life, the Edison, the Corn Exchange, the Security Bank, the Minneapolis Public Library and the Federal Building in the Western Division, and the buildings of the University of Minnesota in the Eastern Division.

The leading hotels are the Radisson, the West, the Nicollet, the Dyckman, the Rogers, the Vendome and the Leamington, the largest family hotel in the country. The leading theaters include the Auditorium, the Metropolitan Opera House, the Bijou, the Orpheum, the Princess and the Shubert. Among the leading churches are the Roman Catholic Pro-Cathedral, the Church of the Redeemer, the Wesley and the Fowler Methodist Episcopal, the Westminster Presbyterian, the Plymouth Congregational, the First Unitarian and the First Baptist.

Industries and Commerce. The abundant water power furnished by St. Anthony's Falls and the nearness of raw material make Minneapolis an important center for the manufacture of lumber and flour. It is the largest flour-manufacturing center in the world, and its great mills, located along the river in the heart of the city, have a combined yearly capacity of 19 million barrels. The flour from these mills has obtained a world-wide reputation for its superior quality, and the extent of the industry has very appropriately given Minneapolis the popular name of the "Flour City."

The manufacture of lumber is the next important industry, and Minneapolis is one of the largest lumber-producing centers of the country. The logs are taken from the forests in the northern part of the state and floated down the Mississippi to the mills. The most modern machinery and labor-saving devices are in use in the mills, which are among the largest in the United States. The manufacture of lumber products, such as doors, sash, interior finishings and furniture, is also extensive. There are also large cooperage works, for whose product the flour mills furnish a constant demand. Other industries include the manufacture of underwear and other knit goods, the production of linseed oil and confectionery, the manufacture of machinery and structural ironwork and the manufacture and repairing of railway cars.

The city is the second center for wholesale trade in agricultural implements and is the largest primary wheat market in the world. An extensive jobbing trade in other commodities is also carried on. Minneapolis and St. Paul constitute the great railway and distributing center for the Northwest, the cities forming the connecting point between the trunk lines from the south and east and those extending to the Pacific coast through Minnesota and the Dakotas and to the Canadian Northwest. Railway facilities for both passengers and freight are of the best. Improvement of the Mississippi to the heart of Minneapolis gives the city a direct water route to the Gulf of Mexico.

Institutions. Minneapolis maintains an excellent system of public schools, with about 80 school buildings and over 60,000 pupils. The leading educational institution is the University of Minnesota, occupying a beautiful site on the east bank of the Mississippi (See Minnesota, University of). Other higher institutions of learning are Hamline University (Methodist Episcopal) at Hamline, Minnesota College (Swedish), Augsburg Seminary (Lutheran), the Minneapolis School of Music, the Northwestern Conservatory of Music, and two normal schools for training kindergarten teachers. The leading hospitals include the Minneapolis City Hospital, the Minnesota State Hospital for crippled and deformed children, the Asbury Methodist, the Northwestern, St. Mary's and St. Barnabas. Among the charitable institutions are the Catholic Orphan Asylum, the Washburn Bethany Home, the Pillsbury House and several free dispensaries.

History. Father Louis Hennepin, a Jesuit missionary, discovered and named the Falls of St. Anthony in 1680. In 1805 a military reservation was established here. In 1838 the territory on

the east bank of the river was thrown open to settlement, and the village of St. Anthony was founded. Ten years later the first sawmill was erected. In 1849 a settlement was begun on the west side of the river, and in a few years this settlement was larger than St. Anthony. It was named Minneapolis, a compound of a Dakota word *minnie,* meaning water, and the Greek *polis,* meaning city. Flour mills were established, and after 1855 the city grew rapidly. The city's development has been coincident with that of the great states to the west, and has been constant and substantial. Population in 1920, U. S. census, 380,498.

Min'nesing"er (from the old German word *minne,* meaning love), the name applied to the German lyric poets of the 12th and 13th centuries, whose chief theme was love. They usually sang their own compositions, accompanying themselves on the harp. Their poetry was mainly chivalric in character, as they flourished when the age of chivalry was at the height of its splendor. The birthplace of German lyric poetry was Upper Austria, but, as the minnesingers carried their sweet music from castle to castle, they wandered far from their native home, even beyond the German border. The names of nearly 200 minnesingers have come down to us, but very few of their songs have been preserved. See MASTERSINGER.

Minnesota, *Min" e so' ta,* THE GOPHER STATE, also *The North Star State,* one of the West North Central States, is bounded on the n. by Canada, on the e. by Lake Superior and Wisconsin, on the s. by Iowa and on the w. by South Dakota and North Dakota. The eastern boundary is formed largely by the St. Croix and Mississippi rivers. The western boundary is formed partly by the Red River of the North, and the greater part of the northern boundary by a chain of lakes and the Rainy River. Owing to a geographical error in the Treaty of Paris in 1783, there is a slight projection northward on the west side of the Lake of the Woods.

SIZE. The extent from north to south is 380 m. The greatest breadth, near the northern boundary, is 346 m., and the area is 84,682 sq. m., of which 3824 sq. m. are water. Minnesota is a little smaller than Idaho or Kansas, larger than Kentucky and Tennessee combined, about two-thirds the size of the United Kingdom and the 11th state in area.

POPULATION. In 1920 the population was 2,387,125. From 1910 to 1920 there was a gain in population of 311,417, or 15 per cent. There are 29.5 inhabitants to the square mile and the state's rank in population is 17.

SURFACE. Most of the state is rolling or hilly without any deep valleys or high elevations. In the northeast corner the surface slopes toward Lake Superior; the land along the lake shore is the lowest in the state, being 602 ft. above the sea. The Mesaba Range to the northwest of the lake contains the highest altitude in the state, 2230 ft. In the northwest part of the state is the great Valley of the Red River of the North, the Minnesota portion of which forms a part of the bed of the geological Lake Agassiz, an extensive tract of level land lying in Minnesota, North Dakota and Manitoba. The elevation of this plain varies from 800 ft. at the Canadian border to about 1000 ft. in its southern part, near Lake Traverse. Between these regions and southward to the Iowa boundary the surface is hilly or rolling. In the southwestern part the crests of the prairie become hills from 1600 to 1800 ft. above the sea level, and are often called by the old French name of *coteaus.* They are the "Mountains of the Prairie" referred to by Longfellow in his *Song of Hiawatha.* The southern and western parts of the state are dissected by a number of river valleys.

In the north-central part of the state is a height of land that forms the water parting of the streams belonging to three great river systems. From its slopes the streams flow into Lake Superior, thence into the St. Lawrence River, to the Mis-

sissippi and to Hudson Bay. The slopes of this water parting are so slight that they are almost imperceptible.

Rivers and Lakes. The Mississippi River rises in Lake Itasca, northwest of the central part of the state, and flows in a southeasterly direction until it reaches the Wisconsin boundary at Hastings; thence it forms the eastern boundary of the state to the Iowa line. It is by far the most important stream in the state and with its tributaries drains nearly two-thirds of the surface. Its most important tributaries from the northeast are the Rum River and the St. Croix. The most important tributary from the southwest is the Minnesota, which flows entirely across the state west to east and enters the Mississippi at Ft. Snelling, near St. Paul. The St. Louis is the principal stream flowing into Lake Superior that lies wholly within the state. The Rainy River, forming part of the northern boundary, flows into the Lake of the Woods, which outflows to Lake Winnipeg and thence into Hudson Bay. The Red River of the North rising near Lake Itasca and receiving a tributary from Lake Traverse, drains the northwestern part of the state into Lake Winnipeg, thence into Hudson Bay. Its chief tributary in Minnesota is the Red Lake River. The Des Moines drains a small section of the southwestern part, and the Zumbrota and Root rivers drain the southeastern part.

Minnesota is estimated to have over 10,000 lakes, the largest number of any state. Many of the lakes are in the celebrated Park Region in the north-central part of the state. Red Lake, having an area of 440 sq. m., is the largest body of water lying wholly within the state. Other large lakes are Leech, Cass, Winnibigoshish, Mille Lacs, and Vermilion. Rainy Lake is on the northern boundary, and only a small portion of the Lake of the Woods is in the state.

Scenery. The Park Region presents one of the most beautiful landscapes in America. It contains thousands of lakes remarkable for their clear water and beautiful forest-clad shores. These lakes are fed by sparkling streams and abound in fish. The shores of many of them are lined with cottages, the summer homes of residents of St. Paul, Minneapolis and cities of other states. Lake Minnetonka and White Bear Lake have a wide reputation as summer resorts. Near Minneapolis are the Minnehaha Falls, celebrated for their beauty and legends. In Pipestone County is a great cliff of red quartzite in front of which lies the Pipestone Quarry made famous by the legend of Hiawatha. This quarry contains the only deposits of this red pipestone known in the country. These attractions and the charming summer climate make Minnesota one of the most delightful regions for summer residence.

Climate. Minnesota has a cool temperate climate. The summers are cool and delightful, but the winters are long and severe. However, the air is clear and bracing and the low temperature is not unpleasant. Considerable snow falls throughout the state, the amount in the north exceeding that which falls in the south. The average rainfall is about 28 inches. The mean annual temperature is 46° in the southeastern part of the state, 44° for St. Paul and Minneapolis and 36° for the north.

Minerals and Mining. Almost limitless deposits of iron ore are found in the region bordering Lake Superior, and Minnesota is the first state in the production of this ore (See Iron and Steel). There are extensive granite quarries at St. Cloud and Ortonville. Limestone valuable for building purposes is quarried in Le Sueur and Blue Earth counties and near Red Wing in Goodhue County. Red quartzite, called jasper, valuable for building and ornamental purposes, occurs in large quantities in Pipestone County. Clay suitable for brick is found in many places, and slate occurs in the northern part of the state.

Forests and Lumber. In the northern half of the state there are extensive forests. The southern part of this area, known as the Big Woods, contains large quantities of hardwood timber. North

of this and extending from the Lake Superior region to the Valley of the Red River of the North are the largest forests of white pine and spruce now existing east of the Rocky Mountains. Lumbering is one of the most important industries of the state, and the annual output amounts to about $43,000,000. The industry gives employment to about 15,000 men.

AGRICULTURE. Minnesota is one of the most important agricultural states. Owing to a variety of soils and differences in climate in different sections, a large variety of crops is possible. Diversified farming is generally practiced. Improved machinery and implements are used, and the farmers resort to the most approved methods of tillage and management.

Soil. The soil varies in different parts of the state. In the Valley of the Red River it is a rich alluvium of great depth. In the prairie region it is generally a loam containing sand and lime and adapted to growing a great variety of crops.

Products. Wheat is the staple crop and in its production Minnesota ranks first. The Valley of the Red River of the North is the most valuable region in the world for raising spring wheat of high grade. This is known in the markets as No. 1 Hard. Wheat is also grown to a greater or less extent in all parts of the state. The combined output averages about 95,000,000 bushels, or one-seventh of all the wheat grown in the country. Barley is the next crop in value, and in its production Minnesota ranks second. Then following in the order of value are corn, oats, flaxseed, rye and potatoes. In the northeastern part of the state large quantities of garden vegetables are raised. In the central and southern parts the hardier varieties of apples and small fruits of all kinds are successfully cultivated. The marshes in the northern and central parts afford excellent land for raising cranberries.

Minnesota is an excellent state for raising live stock, and large numbers of horses and cattle are found on her farms. With scarcely an exception the best breeds are raised, and the excellence of the cattle and horses raised in this state has given the live stock of Minnesota more than local reputation. Dairying has become very important and it is practiced according to the most approved methods. Local creameries owned and controlled by the farmers who supply them with cream are found in all parts of the state. Large quantities of butter and cheese are made. Poultry raising is increasing and a considerable income is derived from it.

MANUFACTURES. The streams furnish abundant water power for manufactures, transportation facilities are good and raw material is produced within the state or can be imported without great expense. These conditions make Minnesota a desirable state in which to locate manufacturing enterprises. The most important industry is the manufacture of flour, in which Minnesota ranks first in the Union. The center of this industry is in Minneapolis, where are found the best flour mills in the world. Similar mills, however, are distributed over the state and their combined output is important. Second in value is the manufacture of lumber and lumber products. The great lumber centers of the state are Minneapolis, Cloquet, Brainerd, Little Falls and Stillwater. Other important industries include slaughtering and meat packing at South St. Paul, the manufacture of boots and shoes, hosiery and other knit goods, wagons and carriages, and the making of beet sugar and confectionery. Duluth has become an important center for the manufacture of iron and steel.

TRANSPORTATION AND COMMERCE. The Mississippi is navigable below St. Paul, and this stream and the St. Croix in their lower courses are used for rafting logs. A few steamers connect St. Paul with ports on the river farther south, but the bulk of the transportation is by rail. Trunk lines of railway extend across the state from east to west and north to south. These are connected by

numerous cross lines so that all parts of the state, except the northern counties which are sparsely settled, have wide access to railway transportation. The railways are controlled by the following systems: the Great Northern, the Northern Pacific, the Chicago, Milwaukee & St. Paul, the Burlington, the Soo, the Rock Island and the Chicago, St. Paul, Minneapolis & Omaha. An excellent interurban system connects St. Paul and Minneapolis and surrounding towns. Electric lines are also found in Duluth and other cities of importance. St. Paul and Minneapolis, called the Twin Cities, are the chief railway centers not only for the state but for the Northwest. Duluth, Mankato and Crookston are also centers in their respective localities.

Minnesota has an extensive commerce. Her flour is found in all states in the Union, and much wheat and flour is sent to European countries. Other agricultural produce is also marketed outside the state. Iron ore, lumber, lumber products and manufactured goods are also exported. Coal, manufactured goods and such foodstuffs as cannot be raised with profit are imported. St. Paul, Minneapolis and Duluth are the great centers of trade. Duluth is one of the important lake ports and has steamer connection with all the leading cities on the Great Lakes. It is an important point for transshipment of freight brought by steamers and transported farther west by the various railway lines.

Government. The constitution was adopted in 1857 and has been several times amended. The Australian ballot system was adopted in 1891. Since 1898 women have had the privilege of voting for school officers and members of library boards, and they are eligible for election to any office pertaining to the management of schools or libraries. The executive department consists of the governor, lieutenant-governor, secretary of state, treasurer and attorney-general, all elected for two years, and an auditor elected for four years. The Legislature consists of a Senate of 63 members, elected for four years, and a House of Representatives of 119 members, elected for two years. The Legislature meets biennially and the sessions are limited to 90 days.

The judicial department consists of a Supreme Court of five judges elected by the people for six years, and District Courts, the judges of which are elected for six years. There is a Probate Court in each county, and townships have courts held by justices of the peace.

Education. Minnesota maintains one of the most thoroughly organized and efficient public school systems in the Union. The schools are under the general direction of a state superintendent of public instruction who is appointed by the governor for two years. There is also a state high school board, consisting of the superintendent of public instruction, the president of the University of Minnesota and the governor. This board has general supervision of the high schools and apportions the state aid which they receive. The district is the unit for administration, but the system is so organized that not only the graded schools in cities and towns, but also the rural schools, have organic connection with high schools and through them with the state university, which is at the head of the public school system. The schools in each county are under the direction of a county superintendent. Certificates to teach are granted by a state board, on examinations which are uniform throughout the state. The high schools and graded schools are under the inspection of state inspectors. State normal schools are maintained at Winona, Mankato, St. Cloud, Moorhead and Duluth. The state university is at Minneapolis; the agricultural college and agricultural school are at St. Anthony Park. There are also a number of agricultural high schools. The leading institutions not under the control of the state are Carleton College, at Northfield; Hamline University at Hamline, in St. Paul; Macalester College, also in St. Paul; Gustavus Adolphus College, at St. Peter; and

Shattuck School, at Faribault. There are also a number of colleges and seminaries under the management of the Roman Catholic Church, the earliest founded being St. John's University, at Collegeville.

State Institutions. The hospitals for the insane are at Rochester, St. Peter, Fergus Falls, Anoka and Hastings. The schools for the deaf, blind and feeble-minded are at Faribault. The state public school for dependent children is at Owatonna. The penitentiary is at Stillwater, the state reformatory at St. Cloud and the state training school at Red Wing.

Cities. The chief cities are St. Paul, the capital; Minneapolis, the largest city; Duluth, Winona, Stillwater, Mankato, Rochester and St. Cloud.

History. Minnesota, after its river of that name, the Dakota "sky-tinted water," was visited by French fur traders as early as 1655. An important conference, in the interests of the fur trade, was held with the northern tribes of the Indians by Sieur du Lhut in 1679 near the site of the city now bearing his name. In 1680 Father Hennepin discovered the Falls of St. Anthony. In 1688 a French settlement was made on Lake Pepin. Given to Great Britain in 1763, to Spain in 1783, to France in 1800, the western two-thirds of Minnesota, lying west of the Mississippi, became part of the United States by the Louisiana Purchase, in 1803. Grand Portage, on the north side of Lake Superior, which was a village of the fur traders as early as 1767, and Ft. Snelling, built in 1820 to 1824, were the first white settlements. In 1823 the first steamboat sailed up the Mississippi into Minnesota. By the treaties of 1837, lands east of the Mississippi were ceded to the United States by the Ojibways and the Sioux. As a result, white settlers came in, and by treaties in 1851 they obtained from the Sioux the great prairie region of southern and western Minnesota, west of the Mississippi River. Having been organized a territory in 1849, Minnesota became a state in 1858. Four years later the state suffered from an Indian outbreak, when over 800 settlers were massacred by the Sioux. Since that time the state has steadily increased in population and wealth. Consult Folwell's *Minnesota,* in the American Commonwealths Series.

Governors. Henry Hastings Sibley, 1858-1860; Alexander Ramsey, 1860-1863; Henry A. Swift, 1863-1864; Stephen Miller, 1864-1866; William Rainey Marshall, 1866-1870; Horace Austin, 1870-1874; Cushman Kellogg Davis, 1874-1876; John Sargeant Pillsbury, 1876-1882; Lucius Frederick Hubbard, 1882-1887; Andrew Ryan McGill, 1887-1889; William Rush Merriam, 1889-1893; K. Nelson, 1893-1895; D. M. Clough, 1895-1899; J. Lind, 1899-1901; S. R. Van Sant, 1901-05; John A. Johnson, 1905-09; A. O. Eberhart, 1909-15; W. S. Hammond, 1915-19; J. A. A. Burnquist, 1919-21; J. A. O. Preus, 1921—.

Minnesota River, a tributary of the Mississippi, rising in the northeastern part of South Dakota, and flowing through Big Stone Lake on the boundary between South Dakota and Minnesota, then across Minnesota, entering the Mississippi opposite St. Paul. It has a total length of 470 m. and is navigable for steamers for 45 m. Falls and rapids obstruct much of its course.

Minnesota, University of, at Minneapolis (1851). Established by the Territorial Legislature, a new charter was granted in 1868 and a year later collegiate work was begun. The university maintains a graduate school, colleges of science, literature and the arts, engineering and architecture, agriculture, forestry and home economics, law, medicine, nursing, dentistry, pharmacy, mines, chemistry, and education; schools of agriculture, experiment stations and demonstration farms at strategic points in the state and an extension department. The Minneapolis campus contains 108 acres and the university farm, 422 acres. Its library contains 266,000 volumes. There are over 12,000 students of whom more than 5,000 are of collegiate grade. The faculty numbers over 600.

Minnow, *Min' o,* a large family of fresh-water fishes, mostly of small size. Two species, the carp and the goldfish, introduced into American waters from the Old World, are of larger dimensions, but by far the greater number are small and used only as bait in catching pike, trout and pickerel. They are recognized by their rounding scales, elevated back having a single dorsal fin, their square nose and low lateral line. Few exceed three inches in length. They are very prolific, and the silver-mouthed minnow is especially common on the sandy beaches of the inland lakes. The shiner, a closely related member of the family, is a common brook fish used as bait.

Min'otaur, in Greek myths, a ferocious monster with a man's head and a bull's body. It fed on human flesh. King Minos of Crete kept it in the labyrinth, where, each year, a tribute of seven youths and seven maidens was delivered by Athens. Theseus killed the Minotaur. See THESEUS.

Min'strel, a name introduced into England by the Normans and applied to one of a class of musical entertainers of medieval times. The minstrel wandered from castle to castle, singing to the music of the harp or telling stories. Sometimes a minstrel attached himself to a lord, whom he followed in all his undertakings. The minstrels of England, especially those who composed their own songs, corresponded in a general way to the Welsh bards, the French troubadours or the Scandinavian scalds. The term *minstrel* is used today to designate one of a troupe of musical performers who give a program consisting of negro melodies, jokes and impersonations.

Mint, a place where money is coined, usually by public authority. In primitive times metals used as money had to be weighed for each transaction. Commerce took a long stride forward when the piece of metal was stamped to indicate authoritatively its weight and purity. This invention is usually attributed to the Lydians, who used gold and silver coins about 900 B. C. Homer, however, mentions brass money as early as 1184. The first Roman coinage was of brass, but in 269 B. C. silver coins came into use, and gold coins shortly thereafter. The most ancient coins now in existence date from the fifth century B. C. Coins have been of various shapes at different times—cubical, square, oblong, octagonal, oval, circular. Experience has shown that the circular disk suffers less from wear, and this has now been very generally adopted.

The right to coin money was early recognized as a function of government; but during feudal times, when the question of governmental authority was in much confusion, the right of coinage was exercised by feudal lords and by monasteries, so that at one time in England there was a mint in nearly every county. From the time of William the Conqueror, however, most of the coining was done in London; but all of the provincial mints were not abolished until the reign of William III. The present royal mint on Tower Hill, London, was erected in 1810-15. This furnishes the coinage for the whole British Empire except Australia and the East Indies, which are supplied from branch mints at Sydney, Melbourne, Perth, Calcutta and Bombay. Although the coining of money is a prerogative of the Crown in England, it is regulated by Parliament; and in Canada, by the Dominion Parliament.

In the United States the power to coin money and regulate its value is vested in Congress by the Constitution. The first mint was established in Philadelphia by the Coinage Act of Apr. 2, 1792, and still remains the chief mint of the United States. Other mints, however, have been established at San Francisco, New Orleans and Denver; while assaying offices are maintained in a number of other cities (See ASSAY OFFICE). In 1873 all mints and assay offices were constituted a bureau of the United States Treasury Department in charge of the director of the mint, who is appointed by the president of the United States for a term of five years,

and serves under the secretary of the treasury. When the first United States mint was established, the method of coinage was very crude, being by means of the old screw hand-press. The process was greatly improved in 1836, again 20 years later, and still again in 1870; so that now the mints of the United States are among the best in the world.

The first coin minted in the United States was the copper cent of 1793. Silver dollars were coined in 1794, and gold eagles in 1795. Coins of various denominations have been authorized at different times during the nation's history. At the present time the money minted is the standard coinage, consisting of gold double eagles, eagles, half eagles and quarter eagles, and silver dollars; the subsidiary silver coinage of half dollars, quarter dollars and dimes; and the minor coinage of nickel five-cent pieces and copper one-cent pieces. Coins struck at the other mints bear a mint mark; those at Philadelphia do not.

The mint receives all bullion or precious metals in any form, offered in quantities of $100 or more, provided the metal is not too base for economical use in coining. It is then weighed to determine its character and degree of fineness; and on the basis of the assayer's report a certificate of its net value is issued, after it has been carefully weighed and the fixed charges deducted. Payment to the depositor is made by mint checks on the United States Treasury. The price of gold is established by the director of the mint, and is $20.672 per fine ounce. Gold is coined free; but silver is purchased by the government at the market price. The metals received are then refined and reduced to ingots or bars of standard size and purity. A gold bar usually weighs 400 oz., .900 fine, and is worth about $8000. The bars are now ready for industrial purposes, or for the next step in the coining process.

Coining Process. This process is in brief as follows: The bars of gold or silver are melted and mixed with copper alloy in the ratio of 9 to 1, so as to render the melted mass .900 fine, which is the standard for gold and silver coins. This metal is then cast into ingots of the right size for the coin required. For gold double eagles, for instance, these ingots are 12⅝ inches long, 1½ inches wide and ½ inch thick, and weigh about 80 oz.; for the silver dollars, they are 12½ inches long, 1⅝ inches wide and ½ inch thick. The ingots are again carefully assayed to determine any variation from the required .900 purity. If they have no greater variation than the slight tolerance permitted by law, they are delivered to the coiner for conversion into coin.

The ingots are now subjected to the "breaking down" process by being passed rapidly between heavy rollers until greatly reduced in thickness. They are then sent to the annealing furnace to remove the hardness and brittleness, and from there to the finishing rolls, or "rolls of precision," through which they are passed four times to develop the thickness and uniformity required for the production of coining blanks. This part of the process has been so perfected as practically to do away with the drawbench formerly used. At this stage the double eagle strip has attained a length of 47⅜ inches, a width of 1⅝ inches, and has been reduced to a thickness of 7-64 inch. The strips are now taken to the cutting machines, where they are tested for correct weight, and are next converted into coin blanks, or planchets, by means of a steel punch working in a matrix.

These planchets are now cleansed and carefully sorted. A slight variation is permitted by law, for gold coins one-half grain in eagles and double eagles, and one-quarter grain in half and quarter eagles; and one and one-half grains for silver dollars. The process has been reduced to such precision, however, that seldom more than one coin in a million is found beyond the legal tolerance. All the coins that are under the legal weight are thrown out to be remelted; those above legal weight are filed down; and the rest are divided into three groups:

"standards," of exact legal weight; "heavies," above the standard but within the legal variation; and "lights," below the standard but within the allowance. These three groups are kept separate until the coins are finished and placed in bags by the coiner.

Next comes the milling process, by which the raised rim is produced around the edge of the coin to prevent abrasion. The planchets are then again annealed, cleaned and brightened, after which they are ready for the stamping presses. These are marvelous products of mechanical skill. They work automatically, the only hand action being to fill the vertical tubes which feed the planchets to the presses. The blanks are seized one by one from the bottom of the tube by automatic fingers and are centered between the two dies within a collar a little larger than the piece to be stamped. The dies are brought together by the operation of a toggle joint with a pressure varying from 175 tons for double eagles to 40 tons for ten-cent pieces. This impact stamps the metal and forces it to spread out and fill the collar, which is grooved on the inside and puts the fine reeding on the edge of the coin. The finished coin is then automatically passed on and is followed by others. The large coins are stamped at the rate of 80 or 90 a minute, the small coins at the rate of 100 or 120. The finished coins are counted and made up into drafts, the lighter and heavier groups being so mixed as to make practically exact weight. The gold drafts of $5000 each, weighing 268.75 troy oz., allow a variation of not more than .01 oz. The silver drafts are $1000 each, the dollars weighing 859.375 oz., and the subsidiary silver 803.75 oz. with a tolerance of .02 oz. After the perfected drafts are made up they are weighed in the presence of the superintendent of the mint, enclosed in canvas bags and delivered into his keeping.

The director of the mint is required to report annually the amount and kinds of coins minted during the year. At stated intervals he also reports the value of the coins of other countries in terms of United States money, so that the value of goods imported may be determined and the customs duties thereon. In addition to the coining of money, it is a part of the work of the mints to strike such metals as may be ordered by Congress. See MONEY, subhead *Coinage.*

Min'to, Gilbert John Elliot-Murray-Kynynmond, FOURTH EARL OF (1845-1914), a governor-general of Canada. He entered the Turkish army in the war with Russia in 1877; and served under Lord Roberts in the second Afghan War in 1878-79. In 1881 he was secretary to Lord Roberts in his mission to the Cape, and was military secretary to Lord Lansdowne while the latter was governor-general of Canada from 1883 to 1885. He succeeded to the earldom in 1891, and seven years later was appointed governor-general of Canada, holding his office until 1904. During his administration the Prince and Princess of Wales visited the colonies. From 1905 to 1910 he was viceroy and governor-general of India.

Minuit, *Min' u it,* or **Min'newit, Peter** (1580-1641), a director of New Netherland under the Dutch West India Company (1625-1631). Purchasing Manhattan Island from the natives, he built Ft. Amsterdam on the present site of New York City. Later, in the service of Sweden, he established Ft. Christina (Wilmington, Del.).

Minutemen, *Min' it men,* in American Revolutionary history, the name given to a special portion of the organized militia which comprised those New England volunteers who, while following their usual occupations, promised to be prepared for a call to arms at a minute's notice. They fought at Lexington.

Mirabeau, *Me" ra" bo',* **Gabriel Honoré Riquetti,** COMTE DE (1749-1791), a statesman and orator of the French Revolution. About 1784 he began his literary career and in 1789 he was elected to the States-General as representative

of Aix. His eloquence and solid statesmanship soon made him the chief of the assembly. It was he who really began the Revolution by his bold refusal to obey the royal command that the delegates of the Third Estate should organize as a separate order. He was an ardent reformer, but he also foresaw the violence toward which the country was tending. To avert the catastrophe, he tried to influence Louis XVI to agree to a constitutional monarchy. He was the only great statesman of the early days of the Revolution and his early death was an irreparable loss to his country. See FRENCH REVOLUTION.

Miracle, *Mir' a k'l,* an event or effect brought about by a suspension or acceleration of the laws of nature, through the agency of God. In the New Testament the word *miracle* is used to translate three Greek terms, *sign, wonder, mighty work,* representing three aspects of the Christian miracles. As a *sign,* a miracle was an indication or proof of divine power or approval; as a *wonder,* it represented the mental attitude it inspired in the beholder; as a *mighty work,* it showed the presence of God. Christ appealed to his miracles as proofs of his divine calling, and it is as *signs* that miracles are chiefly regarded in the Christian dispensation. The older idea of a miracle was that the Divine Agency worked in opposition to natural laws. Modern theologians incline to interpret a miracle, not as an event resulting from opposition to natural law, but as a working out of orderly processes through a secret manipulation of the laws of nature. Christians distinguish between the preternatural effects accomplished by other spiritual agencies, such as devils, and true miracles, which are attributed to God alone.

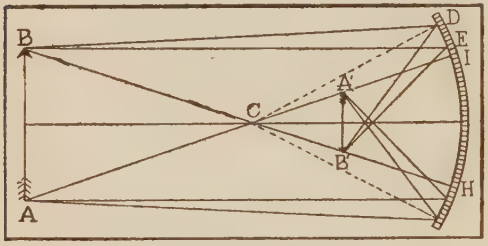
Mirage, *Me rahzh',* an atmospheric phenomenon occurring frequently in certain localities. In deserts it often happens that the atmosphere during motionless intervals becomes abnormally heated near the surface and that in the absence of mixing currents there is a well-defined boundary between the surface layer and the cooler layer above. This bounding surface has the same reflecting property as a mirror placed horizontally. An observer above this boundary sees reflected objects above and beyond its surface; if below, he sees objects below the boundary reflected, the images in each case being inverted, according to the law of reflection. In this way the reflection of a ship may be seen when the vessel itself is below the horizon.

One kind of mirage is due to the refraction, or bending of light rays from objects. This sometimes gives rise to a double mirage, in which the same object is reproduced twice. Such mirages are very deceptive in the desert, as they sometimes give the appearance of oases, with the trees in their natural position; below is the inverted mirage, which has the appearance of a reflection. A common type of mirage is that in which the blue sky is so reflected as to give the appearance on the desert of a vast lake, the delusion being reinforced by the oscillating waves of heat which appear to be ripples on the water.

Mir'ror, a true and polished surface used for reflecting light. Mirrors are made plane and curved, the curved ones having usually spherical or parabolic surfaces. A plane mirror forms a virtual erect image of an object, the image appearing to be as far behind the mirror as the object is in front of the mirror; the image of one's face in a common mirror is an example. Spherical mirrors are used in scientific work and may be either convex or concave. A convex mirror forms a reduced erect virtual image of an object, the image appearing to be behind the surface but closer to the surface than the object is. Such an image of a near-by object is seen when looking at any polished metal sphere. Each small diverging pencil of light emanating from a point of the object and reflected by the mirror to the eye is rendered more divergent, and therefore appears to be coming from a point situated behind the surface and closer to the surface than the object is.

Convex mirrors accordingly correspond to concave lenses in regard to the character of the images they form.

A concave mirror forms either a real or a virtual image according as the object is placed beyond the principal focus of the mirror or between the principal focus and the mirror. The principal focus is situated halfway between the mirror and the center of the spherical surface forming the mirror, and it is the point to which the rays or pencils of light from a distant object are converged by the mirror. Each small diverging pencil of light leaving a point of the object and reflected by the mirror is rendered less divergent or made



CONCAVE MIRROR

convergent; in the first case the reflected light appears to be coming from a point behind the mirror and farther from the surface than the object is, as is apparent on observing the enlarged image of one's face in a concave shaving glass; in the second case the convergent reflected pencil comes to a point in front of the mirror and thus forms a real inverted image of that point of the object, as seen in the illustration, where AB is the object and A'B' the inverted image. In the character of the images formed, concave mirrors correspond to convex lenses.

Concave, parabolic mirrors, from a few inches across to five feet across, are used in reflecting telescopes. Such mirrors form far more accurate images of distant objects, like the heavenly bodies, than do spherical mirrors, and are free from many of the defects of large lenses. See LENSES; TELESCOPE; SOLAR ENGINE; LIGHT, subhead *Reflection of Light.*

Mishawaka, *Mish" a wah' ka,* **Ind.,** a city of St. Joseph Co., 4 m. e. of South Bend, the county seat, on the St. Joseph River and on the Lake Shore & Michigan Southern, the Grand Trunk and other railroads. There is an abundance of water power which contributes to the city's manufacturing interests. It has flour mills and manufactories of heavy machinery, windmills, felt boots, rubbers, furniture, church organs, gas engines, launches, pulleys, wagons and carriages, paper, pulp, agricultural implements and hardware. Mishawaka is one of the oldest towns in northern Indiana. It was settled in 1828 and incorporated in 1834 under the name of St. Joseph Iron Works. The change of name was authorized in 1838 by a special act of the Legislature. Population in 1920, 15,195.

Missionary Ridge, Battle of. See CHATTANOOGA, BATTLE OF.

Missions and Missionaries. The history of missions is the story of the advance and expansion of the Christian Church. During the century following the death of Christ his apostles were devoting their lives to carrying out the command to preach the Gospel to all nations. To the Apostle Paul is due the evangelization of most of Asia Minor and the chief cities of Greece. After the death of Paul, Christianity rapidly spread, until by the time of Constantine (324-337) it had practically covered the Roman Empire. The great missionaries of the fourth and fifth centuries were: Gregory (about 300), who worked in Armenia; Ulfilas (about 325), who gave the Goths the Bible in their own tongue; Frumentius, a Bishop of Abyssinia (about 327); Chrysostom, who founded at Constantinople (404) a training school for Gothic workers; Martin of Tours, who evangelized central Gaul; Valentinus (about 440), apostle of Noricum; Honoratus (about 410), who sent missionaries to France; and St. Patrick, who converted the Irish (about 455).

Between the fifth century and the Reformation the Church brought the Gospel to vast numbers of heathen peo-

ples. Among the most heroic of the early missionaries of this period were the workers from the Celtic Churches of Ireland and the Scottish Highlands, whose efforts bore fruit in Iceland, the Rhine district, Hesse, Thuringia, Bavaria and Alemannia. St. Augustine, first Archbishop of Canterbury, brought the Gospel to the Britons, near the close of the sixth century. Important among later English missionaries was St. Boniface, apostle of Germany (680-755), who died a martyr on the shore of the Zuider Zee. The Scandinavian countries were christianized in the ninth and tenth centuries. Mission work was begun in Bulgaria in the latter part of the ninth century, extending from there to Moravia, Bohemia, Poland and Russia. Vladimir of Russia was baptized in 988, but it was two centuries before Christianity became the dominant religion there. In the 13th century valiant efforts were made by the Franciscan monks to convert the Moslems, and two missionaries of this order penetrated as far as Peking early in the 14th century.

With the opening of the era of discovery and exploration there was added a vast field for missionary endeavor, and we find the monarchs who sent expeditions to the New World were actuated partly by a desire to evangelize the inhabitants of the newly-acquired lands. The Reformation gave rise to one of the greatest missionary agencies the world has ever seen—the Order of Jesuits. The Jesuits were not only active in Europe, but their efforts extended to various Eastern countries and to North and South America. In the beginning of the 19th century Roman Catholic missionary effort was less active than at the time of the Reformation, but in 1822, when the Institution for the Propagation of the Faith was organized, there came a new impetus. Now Roman Catholic missions are world-wide and highly successful. In 1908, among non-Christians, there were 7933 European priests, 5837 native priests, 5270 lay brothers, a native membership of 7,441,215 and 43,000 mission stations.

Permanent missionary effort among Protestants dates from 1793, when William Carey, an Englishman, went to India to work among the Hindus. Since then practically all of the Protestant bodies have established successful and well-organized missionary societies. Along with these agencies, Bible and tract societies have come into existence, such as the American Bible Society (1816) and the American Tract Society (1823). In the United States also originated the great Student Volunteer Movement, which has bands of students in various important colleges and universities, consecrated to some line of missionary work. Students' associations in America, Europe, Asia and Australia, over 150 in number, are now united together in a great International Student Federation. The Ecumenical Missionary Conference, held in New York in 1900, showed the achievements of missionary workers, and, as a result of the interest then awakened, there came the Laymen's Missionary Movement. The most significant event in the history of modern missions was the assembling of the World Missionary Conference at Edinburgh in 1910, an event that has greatly helped to unite Christians of all lands in the work of evangelizing the world.

Mississippi, *Mis" i sip' y,* THE BAYOU STATE, one of the South Central States, also known as one of the Gulf States, is bounded on the n. by Tennessee, on the e. by Alabama, on the s. by the Gulf of Mexico and Louisiana and on the w. by Louisiana and Arkansas. The Mississippi forms most of the western boundary.

SIZE. The greatest length from north to south is 330 m. and the greatest breadth is 188 m. The average breadth is 150 m. and the area is 46,865 sq. m., of which 503 sq. m. are water. Mississippi is about the size of Pennsylvania and Rhode Island combined, or about the size of Tennessee and Connecticut. It is a little smaller than Louisiana and the 31st state in area.

POPULATION. In 1920 the population was 1,790,618. From 1910 to 1920 there

was a loss in population of 6,496, or 0.4 per cent. There are 38.6 inhabitants to the square mile. In order of population the state ranks 23.

SURFACE. The state as a whole is low and level. The highest elevation is in the northeastern part and has an altitude of about 1000 ft. Extending through the state from north to south is a low divide separating the streams that flow into the Gulf from those that flow into the Mississippi. To the east of this divide the surface is generally rolling with occasional hills. To the west of it the surface slopes to the bottom lands of the Mississippi. The region between the Mississippi and the Yazoo rivers is known as the Yazoo Delta. Most of the bottom lands are below the level of the river and are prevented from overflowing by levees (See LEVEE). The coast is irregular and has several indentations, all of which are shallow. There are a number of islands along the coast belonging to the state.

RIVERS. The rivers east of the divide flow directly into the Gulf of Mexico or into the Tombigbee, thence into the Gulf. There are the Tombigbee, the Pascagoula, formed by the Chickasawha and the Leaf, and the Pearl. The rivers flowing into the Mississippi are the Yazoo, the Big Black and the Homochitto.

CLIMATE. Mississippi has a mild, equable climate. The summers are long, but the heat is not intense, owing to the influence of the Gulf breezes. In the northern part of the state ice from one to two inches thick occurs in winter, but in the southern part frost is practically unknown. The winters are short and pleasant. Biloxi, Gulfport, Pass Christian and other towns are favorite winter resorts for people from the North. The annual rainfall varies from 48 inches in the north to 58 inches in the south. The heaviest rains occur in the late winter and early spring.

MINERALS AND MINING. Clay, marl, phosphate rock, cement rock, gypsum and mineral waters are the chief minerals of the state. Mineral waters are bottled and sold in paying quantities at Vossburg and Raymond. Sandstone, limestone and fuller's earth are also found.

FORESTS AND LUMBER. The state contains extensive forests of yellow pine, oak, poplar, ash, hickory and other woods. The largest pine forests are in the south and extend inland from the seacoast for about 150 m. Lumbering is an important industry, as is the production of tar, turpentine and rosin. The yellow pine is chiefly used for lumber, although some hardwood lumber is produced.

AGRICULTURE. Agriculture is the chief industry and for it the state has special advantages of soil and climate.

Soil. It is claimed that nowhere else in the world is there soil of such depth and richness as that found in the bottom lands of Mississippi, and in the higher levels the soil is scarcely less fertile.

Products. Cotton is the chief crop of a large part of the state and the annual yield amounts to about 1,300,000 bales. Corn is next in importance and is raised in all parts of the state. Oats, wheat, alfalfa, rice, hay, sweet potatoes, peanuts, tobacco and garden vegetables are also raised in paying quantities. All fruits of the temperate regions grow in profusion. Plums, peaches and figs are abundant in the central and northern parts of the state, and oranges are grown successfully in the south. In this part of the state considerable sugar cane is also raised The raising of live stock is also becoming an important branch of agriculture.

MANUFACTURES. The production of lumber and of lumber and timber products is the leading manufacturing industry. The manufacture of cottonseed oil and cake is next in importance. Then follow cotton ginning and the manufacture of turpentine and rosin, the making of railway cars, the production of flour and other gristmill products and the manufacture of cotton goods, which is a recent but rapidly-growing industry.

Although Mississippi is not primarily a manufacturing state, since 1890 the

manufacturing industries have developed rapidly and now constitute an important factor in the industrial life of the state.

TRANSPORTATION AND COMMERCE. Mississippi has over 3000 m. of railway. Trunk lines extend throughout the state from north to south and other lines cross these from east to west. The most important systems are the Illinois Central, the Louisville & Nashville, the Yazoo & Mississippi Valley, the Southern, the Kansas City, Memphis & Birmingham and the Mobile & Ohio. The Mississippi and Pascagoula rivers are navigable. Vicksburg, Natchez and Greenville are important ports on the Mississippi and Gulfport is the important seaport. All the large cities and towns have railway communication.

The exports consist of cotton, cottonseed oil and cake, lumber, turpentine and rosin, fruits and agricultural produce, and the imports include the manufactured articles and foodstuffs that cannot be economically produced within the state.

GOVERNMENT. The present constitution was adopted in 1890, and prohibits local, private and special legislation. The executive department consists of the governor, lieutenant-governor, secretary of state, superintendent of public instruction, attorney-general, treasurer and auditor, each elected for four years. The governor, treasurer and auditor cannot succeed themselves nor each other. The Legislature consists of a Senate of 49 members and a House of Representatives of 139 members, all elected for four years. Regular sessions of the Legislature occur once in two years.

The judicial department consists of the Supreme Court of six judges elected for a term of 8 years, salary $5000 yearly, and Circuit and Chancery courts for which justices are appointed for four years.

Mississippi has been one of the leading states in recognizing the rights of married women. The first law for establishing these rights was passed in 1839, and under the present constitution married women are placed on an equality with their husbands in acquiring and disposing of property and in making contracts relative to these transactions. The liquor traffic is prohibited throughout the state.

EDUCATION. The public schools are under direction of a state superintendent of public instruction and of a board of education consisting of the state superintendent, secretary of state and attorney-general. There is a county superintendent in each county. Schools for white and colored children are maintained. There is a normal department for training white teachers in the state university. Revenue is derived from a special school fund and from a poll tax and appropriations made by the state. Schools are making good progress and the educational system of the state is becoming more nearly complete and efficient each year. Cities and towns contain graded schools and high schools. The University of Mississippi at Oxford is the leading educational institution. The agricultural and mechanical college is at Starkville. There is an industrial institute and college for girls at Columbus, a state normal school at Hattiesburg, and the Alcorn Agricultural and Mechanical College for colored students is at Westside. The higher educational institutions not under control of the state are Mississippi College at Clinton, Millsaps College and Bellhaven College at Jackson, Whitworth College at Brookhaven and Blue Mountain College at Blue Mountain. Rust University at Holly Springs and Tougaloo University near Jackson are for colored students.

STATE INSTITUTIONS. Hospitals for the insane are maintained at Jackson and Meridian. There is also a state hospital at Natchez and another at Vicksburg. The schools for the deaf, dumb and blind are at Jackson. The state penitentiaries are located on farms owned by the state.

CITIES. The chief cities are Jackson, the capital; Meridian, Natchez, Vicksburg, Greenville, Columbus, Biloxi, Yazoo, Hattiesburg, Laurel and Gulfport.

History. Mississippi, from the Algonquin "Great River," was visited by De Soto in 1541, by Marquette and Joliet in 1673, and claimed for France by La Salle in 1682. The first settlement was made at Biloxi by D'Iberville in 1699. Rosalie (Natchez) was settled in 1716. The territory was ceded to Great Britain in 1763, and its southern section, called West Florida, was given to Spain in 1781. Two years later parallel 31° was set as the northern boundary of West Florida, but Spain did not agree to this boundary until 1795. In 1798 Mississippi Territory was organized, in 1817 it became a state, and in 1821 Jackson, the capital, was founded. During 1832-34 the Indians removed across the Mississippi. The state seceded Jan. 9, 1861. It was the scene of the battles of Corinth, Port Gibson and Vicksburg. Having adopted a new constitution, 1869, and ratified the Fourteenth and Fifteenth amendments, Mississippi was readmitted February, 1870. In the decade up to 1870, property valuation dropped from about $600,000,000 to about $200,000,000. Since the new constitution of Nov. 1, 1890, voting has been limited to those, otherwise qualified, who can read or interpret any part of the constitution. In 1910 the birthday of Robert Lee was made a public holiday. Consult Tracy's *Mississippi as It Is;* and Riley's *History of Mississippi.*

Governors. David Holmes, 1817-1820; George Poindexter, 1820-1822; Walter Leake, 1822-1825; Gerard C. Brandon, 1825-1826; David Holmes, 1826; Gerard C. Brandon, 1826-1832; Abram M. Scott, 1832-1833; Charles Lynch, 1833; Hiram G. Runnels, 1833-1835; John Anthony Quitman, 1835-1836; Charles Lynch, 1836-1838; Alexander Gallatin McNutt, 1838-1842; Tilghman M. Tucker, 1842-1844; Albert Gallatin Brown, 1844-1848; Joseph W. Matthews, 1848-1850; John Anthony Quitman, 1850-1851; John Isaac Guion, 1851; James Whitfield, 1851-1852; Henry Stuart Foote, 1852-1854; John Jones Pettus, 1854; John J. McRae, 1854-1857; William McWillie, 1857-1859; John Jones Pettus, 1859-1863; Charles Clark, 1863-1865; William Lewis Sharkey, 1865; Benjamin Grubb Humphreys, 1865-1868; Adelbert Ames, 1868-1870; James Lusk Alcorn, 1870-1871; Ridgley Ceylon Powers, 1871-1874; Adelbert Ames, 1874-1876; John Marshall Stone, 1876-1882; Robert Lowry, 1882-1890; J. M. Stone, 1890-1896; Anselm Joseph McLaurin, 1896-1900; Andrew Houston Longino, 1900-1904; James Kimble Vardaman, 1904-1908; Edmund Favor Noel, 1908-1912; Earl Brewer, 1912-1916; Theodore G. Bilbo, 1916-1920; L. M. Russell, 1920—.

Mississippi River, the chief river of the United States and with its longest tributary, the Missouri, the longest river in the world. The Mississippi rises in Elk and Itasca lakes in the northern part of Minnesota and flows southward into the Gulf of Mexico. The length of the main stream, including its windings, is about 2500 m., and the combined length of the Mississippi and Missouri is 4200 m. The Mississippi is generally considered navigable to the Falls of St. Anthony, 2160 m. from its mouth, but navigation for river steamers ends at St. Paul 13 m. below. Above the falls the river is navigable for small boats. The Mississippi is estimated to have over 100,000 tributaries, 240 of which are large enough to be shown on a map drawn on a comparatively small scale; 45 of the tributaries are navigable, and their navigable mileage aggregates over 15,000. The area drained by the Mississippi and its tributaries is about 2,257,000 sq. m., or more than two-thirds the area of the United States, exclusive of Alaska. The large tributaries from the west are the Minnesota, the Des Moines, the Arkansas and the Red; those from the east are the Chippewa, the Wisconsin, the Illinois and the Ohio.

In the upper part of its course the Mississippi flows between high banks, along which, in some sections, are beautiful bluffs from 200 to 300 ft. in altitude. Below St. Paul it forms a broad expanse of water known as Lake Pepin. Between the falls of St. Anthony and

the junction with the Missouri, the Mississippi flows through a valley remarkable for its beauty. Below the Missouri the flood plain becomes broad and low, gradually descending to the level of the river and then below the confluence with the Ohio to a surface lower than that of the river. From here to the sea the surrounding country has to be protected in many places by artificial embankments (See LEVEE; JETTY). Below the Missouri the Mississippi is broad and muddy. From St. Louis to the Gulf the average velocity of the current is less than three miles an hour. In the lower part of its course the river carries great quantities of silt, which is constantly being deposited on its bed. By this means the river has raised its bed until it is higher than the surrounding country. This silt is also the cause of the large delta at the mouth, through which the river enters the sea by a number of channels. By the construction of jetties the channel known as the South Pass has been deepened so that large ocean vessels can ascend to New Orleans. The Mississippi forms the boundary between ten states, as follows: Minnesota and Wisconsin; Iowa and Illinois; Missouri, Illinois, Kentucky and Tennessee; Arkansas, Tennessee and Mississippi; Louisiana and Mississippi. The chief cities on its banks are Minneapolis, St. Paul, St. Louis, Memphis, Baton Rouge and New Orleans.

Mississippi, University of, at Oxford (1844). Opened in 1848, but closed from 1861 to 1865, this university receives interest from the state on more than $500,000, representing the valuation on a township of land granted by Congress in 1819. A second township was granted in 1892 and the total endowment is about $700,000. Its buildings and grounds are valued at more than this amount. The university offers courses in arts, science, pedagogy, philosophy, engineering, mining, law, medicine, pharmacy, education and business administration and maintains a summer school. The library contains about 30,000 volumes. There are some 500 students.

Missoula, *Mi zoo' la,* **Mont.,** the county seat of Missoula Co., situated on the Missoula River and on the Northern Pacific, the Chicago, Milwaukee, & Puget Sound and other railroads, 125 m. w. of Helena. The city occupies a beautiful site in a valley surrounded by mountains. The city is the natural outlet of the Bitter Root Valley and has an important trade in fruit and agricultural produce. Coal is mined in the vicinity and at Bonner. Seven miles distant is a water-power plant which furnishes the city with electricity. Ft. Missoula, a United States military post, is just without the city limits. The city has large sawmills and other manufactories. It is the seat of the University of Montana and has several denominational schools and a business college. Missoula was founded in 1864 and chartered as a city in 1887. It was the first city in Montana to adopt the commission plan of government. Population in 1920, U. S. census, 12,668.

Missouri, *Mis soo' ry,* one of the West North Central States, is bounded on the n. by Iowa, on the e. by Illinois, Kentucky and Tennessee, from which it is separated by the Mississippi River, on the s. by Arkansas and on the w. by Oklahoma, Kansas and Nebraska. The Missouri River forms the northern half of the western boundary.

SIZE. The length from north to south is 287 m. The average breadth is 255 m. and the area is 69,420 sq. m., of which 693 sq. m. are water. Missouri is almost the exact size of Scotland, Ireland and Wales, or of Washington, a little smaller than North Dakota and the 18th state in area.

POPULATION. In 1920 the population was 3,404,055. From 1910 to 1920 there was a gain in population of 110,720, or 3.4 per cent. There are 49.5 inhabitants to the square mile and the state ranks ninth in population.

SURFACE. That portion of the state north of the Missouri River is an upland plain or prairie region. It is somewhat broken or hilly in the western part and the streams have deep, broad val-

leys. The elevation changes from 500 ft. on the Mississippi to about 1200 ft. in the northwest corner of the state. South of the Missouri the state is divided into two regions, that occupied by the Ozark Plateau and the lowlands in the southeast. The Ozark region, or Ozark Plateau, has for its distinguishing feature a range of hills extending across the state from east to west. These are low elevations with rounded summits, having altitudes ranging from 1100 to 1600 ft. The Ozark Plateau extends northward from these hills to the central part of the state. The lowlands in the southeast have an area of about 3000 sq. m. This region has an undulating surface and in its lowest parts it is marshy, containing numerous lagoons. Some of the lowest land is protected from the Mississippi by levees. There are high bluffs along the Mississippi and Missouri, some of which have an altitude of 150 ft. above the water.

Rivers. The state is drained directly or indirectly into the Mississippi. The Missouri, flowing across the state from west to east a little north of the median line, drains by far the greater part of its surface. Its chief tributaries from the north are the Platte, the Grand and the Chariton, and from the south the Osage, the Gasconade and the Lamine. The Wyaconda and the Salt drain the northeast corner of the state directly into the Mississippi. The St. François drains the southeast corner. The Meramec flowing northeasterly drains the south-central part of the Ozark region into the Mississippi. The White and Black flow southward into Arkansas.

Scenery. Several streams of the White system have canyonlike gorges in their lower courses. In the Ozark region in the southwestern part of the state, especially in Stone, Christian, Greene and McDonald counties, are numerous caverns, some of which are of unusual interest. Marble Cave in Stone County contains a room which is 325 ft. long and 125 ft. wide and has a vaulted roof rising from 100 to 195 ft. In Camden County is Hahatonka Park, of 5400 acres. This park contains a number of natural curiosities, including seven caves, a balanced rock, a natural bridge and a large amphitheater with remarkable acoustic properties.

Climate. The climate of Missouri, unprotected by mountain ranges and lying far from the ocean, is one of extremes in heat and cold, moisture and drought. The mean annual temperature is 54.6°, the lowest average being in the extreme northwestern counties, where it is slightly below 50°. In the extreme southeastern counties it about 60°. July is the warmest month, January the coldest. In the summer months the temperature occasionally reaches 100°. In winter, extreme cold waves sometimes sweep over the state, but periods of extreme cold or of extreme heat are not usually of long duration. The mean annual rainfall is 39.17 inches; the rainfall varies from about 35 inches in the northwestern plateau to nearly 45 inches for the southeastern lowlands. The snowfall ranges from about 10 inches in the southeastern to about 25 inches in the northwestern portion of the state.

Minerals and Mining. The coal fields of Missouri have an area of 23,000 sq. m. and coal constitutes the state's most valuable mineral resource. These fields are a continuation of the coal fields in Kansas and Iowa and lie north and west of a line extending from Springfield to Hannibal. In the Ozarks are extensive deposits of iron ore, the largest being at Pilot Knob and Iron Mountain. The ore here is practically inexhaustible, though the mines are not yet extensively worked. Missouri is the leading state in the production of lead and zinc, and has large mines in the vicinity of Joplin and at Webb City, Granby and Aurora. Clay suitable for common brick and fire brick is found in nearly all parts of the state, and limestone, granite, marble, oynx and other building stones occur in large quantities. Cement rock is found in many localities and the manufacture of ce-

MISSOURI

ment and quicklime are important industries. Cobalt and nickel occur with lead, and nearly all the nickel produced in the United States comes from Missouri. Large quantities of barites are mined and used in the manufacture of paint.

FORESTS AND LUMBER. In the southeastern part of the state are valuable forests of oak, hickory, elm, maple, ash, locust, yellow pine, cypress and other woods. Forests are also found bordering the Mississippi and the Missouri. Lumbering is an important industry in the southeastern part of the state and in some localities a thriving business is done in providing railway ties. The yearly value of the lumber output is over $10,000,000.

AGRICULTURE. Agriculture is the leading industry and Missouri is one of the important agricultural states. The farms are of medium size and diversified farming is generally practiced.

Soil. In the lowlands the soil is a deep, rich alluvium; on the uplands it is usually loam. Throughout the state the soil is generally fertile.

Products. Missouri has a great variety of agricultural products. Corn, wheat, rye, oats, buckwheat, barley, tobacco and hay and forage are the principal field crops. All kinds of fruits suited to a temperate climate are grown. Apples, pears, peaches, plums, cherries and small fruits are raised extensively in the central and northern section. In the south apricots, nectarines, grapes and figs are raised. Missouri is one of the leading states in the production of apples, and the production of grapes is such as to result in the making of large quantities of wine. The state is also widely known for the excellent melons raised in the southern part. In some localities garden vegetables are raised for St. Louis and other markets.

Missouri is an important live-stock state. It leads the Union in the number of mules; and horses, cattle, sheep and hogs are found on nearly all farms. The abundance of corn makes the fattening of hogs very profitable. In the Ozark regions conditions are especially favorable to raising sheep, and the production of wool is here an important industry. Dairying and poultry raising also contribute materially to the prosperity of the farmer.

MANUFACTURES. Manufacturing industries have developed rapidly within the last few years, and Missouri is the leading manufacturing state west of the Mississippi. St. Louis is the chief manufacturing center, over two-thirds of the industries being in or around that city. The most important industries are the manufacture of tobacco and tobacco products, slaughtering and meat packing, the production of machinery, the manufacture of confectionery, of boots and shoes and of flour and gristmill products, making machinery, printing and publishing, making cars, and the manufacture of clothing, agricultural implements and wagons and carriages. Kansas City and St. Louis are the important manufacturing centers. Joplin is the center for the zinc industry.

TRANSPORTATION AND COMMERCE. The Mississippi furnishes water connection with New Orleans, and large quantities of freight are shipped by this route. The Missouri is navigable, but owing to the construction of railroads this river is but little used. Missouri has over 10,000 m. of railway. The northern half of the state is crossed by great trunk lines extending east and west; the southern tiers of countries are not yet fully supplied with railway transportation. The most important systems are the Pennsylvania, the Baltimore & Ohio, the Wabash, the Illinois Central, the Alton, the Rock Island and the Burlington, centering in St. Louis from points north and east. The Missouri Pacific, the San Francisco and the Iron Mountain extend from St. Louis west and south. There are numerous cross lines connecting these trunk lines, and the large cities all have electric lines. St. Louis is the great railway center, more than 30 railways entering the city. Kansas City, Springfield and Cape Girardeau are also important railway centers for their respective localities.

Missouri has an extensive commerce with surrounding states. Fruit, vegetables, live stock, corn, wheat and other produce, and manufactured goods are sent to all near-by centers of trade, and some products find their way to other parts of the country. St. Louis is the distributing center for the great region to the south and west and has an extensive wholesale trade. It is also an important point for the transshipment of goods received from states farther east and north. Manufactured goods and some foodstuffs are imported.

GOVERNMENT. The present constitution was adopted in 1875. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general and superintendent of public instruction, all elected for four years. The Legislature consists of a Senate of 34 members elected for four years, and a House of Representatives of 142 members elected for two years. The sessions are held biennially and are practically limited to 70 days.

The judicial department consists of a Supreme Court of seven judges elected for ten years; three District Courts of Appeal, each having three judges elected for 12 years; and Circuit Courts, the judges of which are elected for six years. Each county has a County Court and a Probate Court and there are justice courts in villages and towns. The three District Courts are located at St. Louis, Kansas City and Springfield.

EDUCATION. The public school system is under the general supervision of a state superintendent of public instruction. The law requires the maintenance of separate schools for white and colored children. The district is the unit for administration and each school is under the direction of the local board. Schools in towns and cities are well graded and provide high school courses. Many of the rural schools are graded and have a uniform course of study. Throughout the state the public schools are increasing in efficiency each year. State normal schools are maintained at Warrensburg, Kirksville, Cape Girardeau, Springfield and Maryville. Lincoln Institute at Jefferson City is for training colored teachers. The University of Missouri, which is at Columbia, has organic connection with many affiliated high schools.

The higher institutions not under control of the state are Washington University at St. Louis, St. Louis University, William Jewell College at Liberty, Drury College at Springfield, Central College at Lafayette, and Westminster College at Fulton.

STATE INSTITUTIONS. The hospitals for the insane are at Farmington, Fulton, Nevada and St. Joseph. The school for the deaf and dumb is at Fulton and the school for the blind at St. Louis. The institute for the feeble-minded is at Marshall and there is a state tuberculosis sanatorium at Mt. Vernon. The state prison is at Jefferson City; there is a boys' reform school at Boonville and a girls' reform school at Chillicothe.

CITIES. The chief cities are Jefferson City, the capital; St. Louis, Kansas City, St. Joseph, Springfield, Joplin, Sedalia, Hannibal, Cape Girardeau, Carthage, Moberly, Nevada, Chillicothe and Independence.

HISTORY. Missouri, from the Algonquin and Dakota "Great Muddy" (river), was explored by De Soto in 1541, touched by Marquette and Joliet in 1673 and claimed for France by La Salle in 1682; Ste. Genevieve, 1755, was the first permanent settlement. In 1764, St. Louis was settled by Pierre Laclède Ligueste. By the Treaty of 1763, Missouri fell to Spain. In 1800 it was given to France and became a part of the United States through the Louisiana Purchase in 1803. Missouri Territory, having been organized in 1812, was admitted as a state, 1821, after a long period of contest (See MISSOURI COMPROMISE). The *Enterprise,* 1815, was the first steamboat on Missouri waters.

On the question of slavery and secession, the state was divided, and, though controlled by the Union forces during the war, it furnished about 30,000 troops for the South against about 100,000 for

the North. It alone, early in 1865, voluntarily freed its slaves. Since the Civil War, Missouri has enjoyed phenomenal prosperity. The St. Louis Exposition, 1904, celebrated the centennial of the Louisiana Purchase. Consult Carr's *Missouri,* in the American Commonwealths Series.

GOVERNORS. Alexander McNair, 1820-1824; Frederick Bates, 1824-1825; Abraham J. Williams, 1825; John Miller, 1825-1832; Daniel Dunklin; 1832-1836; Lilburn W. Boggs, 1836-1840; Thomas Reynolds, 1840-1844; M. M. Marmaduke, 1844; John C. Edwards, 1844-1848; Austin A. King, 1848-1853; Sterling Price, 1853-1857; Trusten Polk, 1857; Hancock Jackson, 1857; Robert M. Stewart, 1857-1861; Claiborne F. Jackson, 1861; Hamilton R. Gamble, 1861-1864; Willard P. Hall, 1864-1865; Thomas C. Fletcher, 1865-1869; Joseph W. McClurg, 1869-1871; B. Gratz Brown, 1871-1873; Silas Woodson, 1873-1875; Charles H. Hardin, 1875-1877; John S. Phelps, 1877-1881; Thomas T. Crittenden, 1881-1885; John S. Marmaduke, 1885-1887; Albert P. Morehouse, 1887-1889; David R. Francis, 1889-1893; William J. Stone, 1893-1897; Lon V. Stevens, 1897-1901; Alexander M. Dockerey, 1901-1905; Joseph W. Folk, 1905-1909; Herbert S. Hadley, 1909-1913; Elliott W. Major, 1913-1917; F. D. Gardner, 1917-21; A. M. Hyde, 1921—.

Missouri Compromise, an important law passed by the United States Congress in March, 1820. In 1812, when Louisiana was admitted into the Union, the South had an equal number of states with the North, and since then the balance had been kept even. With the admission of Alabama in 1819 as a slave state there were 11 slave states and an equal number of free states. Soon after, the question of the admission of Maine and Missouri came up for discussion in Congress. If both were admitted as free states the balance would be disturbed, and the pro-slavery faction vigorously opposed any restriction against slavery in the Missouri bill. In 1820 a compromise was effected whereby Maine was to be admitted as a free state and Missouri as a slave state, but thereafter slavery was to be forever prohibited in the territory north of parallel 36° 30′, the southern boundary of Missouri. This famous compromise had the strong support of Henry Clay, then speaker of the House. It adjusted matters for a number of years, but was repealed by the Kansas-Nebraska Bill. See KANSAS-NEBRASKA BILL.

Missouri River, a large river of the United States and the chief tributary of the Mississippi. It is formed by the junction of the Gallatin, the Jefferson and the Madison rivers, or forks, which have their sources in the Rocky Mountains and unite at Gallatin City in the southwestern part of Montana. The Missouri flows northward, then eastward into North Dakota, thence in a southeasterly direction to Kansas City, from which point it flows across Missouri and enters the Mississippi 20 m. above St. Louis. From its source to its junction with the Mississippi, including the Jefferson, it is about 3000 m. long and exceeds in both length and volume the Mississippi above their junction. The area of its basin is about 800,000 sq. m. The Missouri is a rapid, muddy stream. At Great Falls there is a series of cataracts, and the river descends about 400 ft. in a distance of 15 m. The chief tributaries are the Yellowstone, the Platte and the Kansas from the west, and the James and the Big Sioux from the north. During high water the Missouri is navigable to Fort Benton, Mont., about 2300 m. from its mouth, and during low water, steamers ascend the river as far as Fort Buford, N. D. The chief cities along its banks, proceeding down stream, are Helena, Great Falls, Bismarck, Pierre, Sioux City, Council Bluffs, Omaha, Nebraska City, St. Joseph, Leavenworth, Kansas City and Jefferson City.

Missouri, University of, at Columbia (1839). This is the oldest state university west of Indiana. It opened in 1841, the same year as the University of Michigan, and it early became a coedu-

cational institution. It has a College of Arts and Science for undergraduates, a Graduate School, a College of Agriculture, a School of Education, a School of Law, a School of Medicine, a School of Engineering, a School of Journalism, a School of Business and Public Administration, and an Extension Division. The School of Journalism of the University of Missouri was the first to offer courses leading to a degree in journalism and the first to be established on an equal basis with the other professional schools of the University. The School of Mines, which is a part of the University, is at Rolla in the southern part of the state. The College of Agriculture occupies a large campus just east of the main university campus in Columbia. It has an experimental farm of more than 700 acres. The annual income of the university is about $1,250,000. The library contains more than 250,000 volumes. There are about 3,500 students enrolled each year. The university grounds at Columbia occupy more than 800 acres. An Agricultural Experiment Station and an Engineering Experiment Station are also situated at Columbia.

Missouris, a tribe of North American Indians, belonging to the Siouan stock, first met with along the Grand River, a tributary of the Missouri. It is thought that they were once identified with the Iowa and Otò Indians. In 1805 they settled largely along the Platte River in Nebraska, where they joined the Otoes. A large per cent of them have made much progress in educational and industrial arts.

Mistletoe, *Mis' 'l to,* a parasitic shrub of the Mistletoe Family depending for its subsistence upon the life of other trees. It grows chiefly upon the limbs of oaks, apples, cypresses, elms and maples, but may be found upon evergreen trees. The growth begins by the berry, which is sticky, adhering to the branch of some host plant upon which it has fallen, and there remaining until the coat of the berry exposed to the air has hardened. As the embryo grows, its only means of escape from this shell is through the still soft portion next the bark. It enters the tree, takes root and begins to put forth stems which are angular in form and of a yellowish-brown color. The leaves, which are long-oval, are of the same characterless color, but when the sunlight shines through them they take on a beautiful gold. In American species the leaves remain unwithered until the new growth appears. The flowers are insignificant, growing on spikes about the length of the leaves. In August or September a semitransparent berry appears which adds greatly to the mystic charm of the plant.

Mistletoe grows in the United States from Illinois southward. That used in England is produced in the apple orchards of Normandy. Many ancient Druidic legends are centered about the mistletoe, and by long-established custom it remains in England and the United States one of the emblems of the Christmas season. It is the state flower of Oklahoma.

Mitchell, *Mich' el,* **Donald Grant** (1822-1908), best known as Ik Marvel, an American author, born in Norwich, Conn. He graduated at Yale in 1841 and after studying law for some time took up literature. Ill health drove him to an outdoor life and this brought about an interest in landscape gardening and agriculture. He became consul at Venice in 1853 and was a United States commissioner at the Paris Exposition of 1878. His scope was not wide, nor did he probe deeply into profound subjects, but his dreamy, sentimental writings won for him a wide popularity. Among his works are *Reveries of a Bachelor, Dream Life, a Fable of the Seasons* and *Doctor Johns.*

Mitchell, John (1870-1919), an American labor leader, born in Will County, Ill. His educational advantages were limited, but he studied law, and later was employed in the coal fields of Illinois. He has been connected with the labor unions since he was 16 years of age, and has held office in the United States Mine Workers of America since he reached his majority, being its president for sev-

eral years after 1899. He is a leader also in the American Federation of Labor, and in the National Civic Federation. He has been commended for his good judgment in the management of the coal workers' strikes of 1900 and 1902, and in other labor movements of great magnitude.

Mitchell, Maria (1818-1889), an American astronomer, born at Nantucket, Mass. Her father was a teacher of astronomy, and she gave him considerable assistance in his work. This service resulted in qualifying her for independent work. In 1847 she discovered a new telescopic comet, in recognition of which the King of Denmark awarded her a gold medal. While employed in the coast survey by the government she assisted in compiling the Nautical Almanac. In 1857 she visited observatories in Europe, and was the first woman to be made a member of the Academy of Arts and Sciences. In 1865 she became professor of astronomy in Vassar College, where she continued to serve until her death. She wrote many scientific papers. See ASTRONOMY.

Mitchell, Silas Weir (1829-1914), an American nerve specialist and author, born in Philadelphia, Pa. He graduated at Jefferson Medical College in 1850, and became a specialist in the treatment of nervous diseases, developing the method of curing nerve troubles which is known as the "rest-cure." His early writings were medical treatises, but after 1880 he devoted much of his time to literature. Dr. Mitchell published several collections of poems and a number of short stories and novels. His historical novel of the Revolution, *Hugh Wynne, Free Quaker,* was very successful. Other writings are *Adventures of François, Dr. North and his Friends, A Diplomatic Adventure, The Comfort of the Hills, The Red City* and *John Sherwood, Ironmaster.*

Mitchell, S. D., a city and the county seat of Davison Co., 72 m. n.w. of Sioux Falls, on the Chicago, Milwaukee & St. Paul, the Chicago & North Western and other railroads. It is the central market for a rich grain and live-stock region and contains a number of large industrial plants, including grain elevators, creameries, wholesale fruit establishments, brick and lumber yards and railroad and machine shops. Here is located Dakota University, a Methodist Episcopal institution established in 1888. St. Joseph's Hospital, a Carnegie library, an opera house and a city hall are other prominent features. Settled in 1879, Mitchell was incorporated in 1883 and first chartered in 1890. It is now administered under the commission form of government. Population in 1920, 8,478.

Mite, an order of tiny Arachnids having unsegmented abdomens. Some are parasites, and many are found upon living plants. The best-known mites are the ticks and the red spiders, which are often found upon stems of rosebushes and upon house plants. One species lays its eggs in the leaf of the pear and produces there a modification of the cells known as pear leaf-blister. The cheese mite and itch mite bore into the human skin and cause disease, while the cattle tick infest domestic cattle. See TICK; ARACHNIDA.

Mit'ford, Mary Russell (1787-1855), an English novelist and dramatist, born in Alresford. Her most successful work was the series of sketches called *Our Village,* a fresh and sympathetic portrayal of rustic scenes and characters, written with charming grace and humor. Among her other writings are *Miscellaneous Verses, Julian, The Foscari, Rienzi* (the best of her plays) and *Belford Regis,* a novel of country life.

Mithri"da'tes the Great (about 134-63 B. C.), King of Pontus. When 13 years of age he succeeded his father. He was a persistent enemy of Rome, and when a young man began his plan to drive the Romans from the East. He had already taken Asia Minor and had led armies into Greece, when he was met and defeated by Sulla. In 74 B. C., after Sulla's death, he again rose against the Romans but was defeated by Lucullus and forced to retreat to Armenia. For the third time he warred against

Rome and had regained the greater part of his possessions when Pompey was placed in command by the Romans, with absolute power in the Eastern provinces. He gained a signal victory over Mithridates near the Euphrates River.. Mithridates was well educated, especially in Greek literature, and was a generous patron of learning.

Mi'vart, St. George Jackson (1827-1900), an English zoologist, born in London and educated at Harrow, King's College and St. Mary's College. He was lecturer on comparative anatomy and zoology at St. Mary's Hospital, London, and professor of biology in the Roman Catholic University College, Kensington, and of the philosophy of natural history at the University of Louvain, Belgium. He wrote on morphology and the classification of Vertebrates, contributed to the discussion on evolution and attempted to reconcile scientific facts with religious doctrines. His works include *Man and Apes, The Cat, Nature and Thought* and *On Truth.*

Mo'ab, a son of Lot, whose descendants, called Moabites, occupied the land immediately to the east of the Dead Sea. They were an idolatrous people, frequently at war with the Israelites. The book of *Ruth,* however, shows that the two peoples were on friendly terms at the time when Naomi and her family "went to sojourn in the country of Moab."

Mo'abite Stone, an ancient stone of black basaltic granite discovered in 1868 at Diban, in the ancient land of Moab, by F. Klein, a German missionary. Before it could be removed, it was broken to pieces, but the fragrants were collected, and are now in the Louvre, Paris. The stone is especially interesting because of the inscription which was engraved upon it. This inscription, which is in the Moabitish language, consists of 34 lines and dates from about 860 B. C. It records the deeds of Mesha, King of Moab, and his wars with Omri, King of Israel, and his successors.

Moat, *Mote,* a mound and also the excavation made in building the mound; a ditch or canal surrounding a castle, and usually filled with water. The moat was a part of the fortification of a castle during the Middle Ages. It was also called a dike, a ditch and a fosse, and was crossed usually by a drawbridge. In modern times the moat is usually dry; the sides, or scarp and counterscarp, are as steep as possible, generally revetted. See GABION.

Mo'berly, Mo., a city of Randolph Co., 129 m. n.e. of Kansas City, on the Wabash, the Missouri, Kansas & Texas and other railroads. The industrial plants include machine shops, foundries, brickyards, cement works, a large grain elevator, a shoe factory, ice works and a frame factory. An extensive trade is carried on in dairy and farm products, poultry, live stock, wool, hides, lumber, tobacco, flour and bricks. Prominent features of the city are St. Mary's Academy, a Carnegie library, a Y. M. C. A. Building, a commercial college and a hospital. Moberly was laid out in 1866 and incorporated as a town in 1868; it is administered under a revised charter of 1889. Population in 1920, 12,789.

Mobile, *Mo beel',* **Ala.,** a port of entry and the only seaport of the state, and the county seat of Mobile Co., situated in the southwestern part of the state on the west bank of the Mobile River at the head of Mobile Bay. The city lies 30 m. n. from the Gulf and 140 m. n.e. of New Orleans, on the Southern, the Louisville & Nashville, the Mobile & Ohio, the Mobile, Jackson & Kansas City, the Tombigbee Valley and other railroads, and on the steamboat lines which connect it with all American ports as well as those of Europe and the Pacific coast. River boats ascend through the navigable waters of the adjacent states, uniting the city in trade with Montgomery, Tuscaloosa, Columbus and even with the Great Lakes. The city lies on a sandy plain that rises gradually to a chain of low hills at the west.

STREETS, PARKS AND PUBLIC BUILDINGS. The residence portion of Mobile is especially attractive because of its wide lawns and broad, well-kept streets.

Magnolia and live-oak trees line all the ways. and shrubs and flowering plants add to the charm. In the business section the streets are also well cared for, being wide and smoothly paved. Aside from its parks, Mobile has many recreation places in the pine groves adjoining the city, and these have become favorite places for winter resorts.

Among the noticeable public buildings are the beautiful Cathedral of the Immaculate Conception, the Church of St. Joseph, a commodious customs-house, the Federal Building, the Southern Market, the armory, a Y. M. C. A. Building, the courthouse, the public library, the United States Marine Hospital, a city hospital, Providence Infirmary and many excellent hotels and office buildings.

Educational Institutions. The University of Alabama, located at Tuscaloosa, has its medical school in Mobile, and among its other educational institutions are the academies of Visitation and of the Immaculate Conception, both for girls, the Convent of Mercy, the Emerson Normal and Industrial School for Negroes, McGill Institute, the University Military School and an unexcelled system of public schools. Just outside of the city is Spring Hill College, a Jesuit school.

Chief Industries. Owing to its unexcelled position for trade, Mobile is a commercial city of great importance. Its shipment of cotton alone from the great cotton region about it would render the city one of the leading ports of the state. This brings with it the accompanying cotton mills, cottonseed-oil presses and the great cotton exchange. The harbor has been recently deepened and improved to meet the ever-increasing traffic, and this has attracted other industries of greater or less extent. Lumber, timber, naval stores, vegetables, fruits, coffee, coal, sulphur and asphalt are among the other exports. The fishing carried on in the river and bay is a valuable source of income. The manufactories include those of sash and doors, cordage, tobacco and cigars, ship-building and cedar pencils.

History. Mobile was founded by the French in 1702, and until 1720 was the capital of the Province of Louisiana. With all of the Territory of Louisiana, it was ceded to Great Britain in 1763, but was captured by the Spanish in 1780, under whose possession it remained until 1813; under the authority of the Federal Government it was seized on the claim that it was a part of the Louisiana Purchase. It was, in 1814, the headquarters of Andrew Jackson who there resisted the attack of the English in September. The city charter was granted by the first Legislature of Alabama in 1819. From its strategic position Mobile was an important Confederate seaport in the Civil War, and in spite of an attempted blockade on the part of the Federal troops, trade with the West Indies was kept up until August, 1864, when Admiral Farragut succeeded in passing the Confederate forts and capturing the *Tennessee* and other battleships in the harbor. Later the forts surrendered and Federal troops occupied the city. Since the adoption of the last charter (1887), the city has been prosperous and has advanced rapidly in trade, population and civic improvement. September, 1910, the commission form of government was adopted. Population in 1920, 60,124.

Mobile Bay, Battle of, an important engagement of the Civil War, fought Aug. 5, 1864, between a Federal fleet, under Farragut, and an inferior Confederate fleet, under Buchanan, aided by land batteries. Forts Gaines and Morgan guarded the entrance to the bay, within which was a line of sunken torpedoes. Beyond these were Buchanan's vessels and the ram *Tennessee*. Tied to the mast of his flagship, Farragut steamed into the harbor, at the same time bombarding the forts. The engagement was short but furious. Only one torpedo exploded and this wrecked the Union vessel *Tecumseh;* two Confederate gunboats were destroyed, a third was forced to flee and the *Tennessee* was captured. Shortly after, the two forts were captured by a land force under General Granger.

Moccasin, *Mok' a sin,* a kind of loose shoe worn by the American Indian. Unlike the sandal, it extends over the top of the foot, the whole being in one piece. Moccasins are made of buckskin, and are flexible and durable; and nothing more practicable as a foot covering ever has been invented.

Moccasin Snake, an American member of the Viper Family found in eastern United States, Mexico and Central America; in the Old World it is found only on the shores of the Caspian Sea. The water, or cotton-mouthed, moccasin is a semiaquatic serpent about four feet in length. Its stout, heavy body in color is olive marked with dark blotches; its head is broad and vicious-looking. The moccasin is one of the few deadly American snakes.

MOCKING BIRD

Mocking Bird, a family of birds, members of which are about the size of a robin and may be known by their grayish bodies, blackish, white-barred wings and white outer tail feathers, which are conspicuous in flight. Both sexes are alike. The mocking bird is the most gifted of birds in a family noted for its songsters. Not only has it a peculiarly sweet and melodious song, but its powers of imitating the notes of other birds and the sounds of other animals are seemingly endless. As a cage bird it is easily kept in captivity, seeming to prefer the society of man. The nest is built either in undergrowth or in trees like the oak and cedar, and contains four bluish eggs with reddish spots. Though a common bird in the temperate and torrid zones of North and South America, the mocking bird is rare north of Delaware, although occasionally seen as far north as northern Illinois and southern New England.

Modern Woodmen. See WOODMEN OF AMERICA, MODERN.

Mo'doc, a tribe of North American Indians formerly living near Klamath Lake in southwestern Oregon. They resisted the whites in what is known as the Modoc War, but in 1873 were forced to give up their lands, which had been ceded to the United States in 1864. The greater part of the tribe is now in Oklahoma and the remainder on a reservation near Klamath Lake.

Moham'med, or **Mahom'et** (about 570-632), the founder of Islam, or Mohammedanism, born in Mecca, Arabia. His father died before his birth or shortly thereafter, and his mother when he was six years old. Little is known of his early years, as the legendary stories concerning him are wholly untrustworthy. He was cared for by his grandfather and later by his uncle, Abu Talib; assisted in gaining his living by herding sheep and gathering wild berries for the Meccans; and accompanied his uncle on some of his journeys to south Arabia and Syria. In his 25th year he became the agent of Khadija, a wealthy widow 15 years his senior, whom he finally married. He conducted her business at Mecca, made journeys in her interests, and was esteemed for his integrity and good judgment. But this was only one side of his life. From childhood he had been subject to epileptic fits, and these or other causes had developed a somewhat melancholy tendency in his character. He often withdrew to a cave at Mt. Hira, which became his favorite place of meditation, and here his mind dwelt upon the religious conditions of his country. Thus the years passed rather uneventfully until he reached the age of 40, when he announced his revelation and began his work as a prophet.

The time was ripe in Arabia for such a movement. By the year 600, Judaism and Christianity had made an entrance into the country, ancient sects had revived, and religious ferment was undermining the time-honored star-worship of the land, with its pilgrimages, temples and festive ceremonies. Mohammed in his travels had come into contact with the new ideas, as had also been the case in his residence at Mecca, whither pilgrimages were made from every direction. He felt the need of a new religion that should combine the sacred traditions of Arabia with the monotheism and morality of Judaism and Christianity. Like other Oriental prophets, he claimed to have received a divine revelation and commission, when, as he meditated on these things in the solitude of Mt. Hira, the angel Gabriel appeared to him and commanded him to proclaim the true religion of Allah.

When Mohammed declared himself to be the prophet of a new religion he was met with ridicule by his own family. His wife, however, soon came to believe in his claims and other members of his family were converted. By means of his continued private teaching, his doctrine spread, until after four years he had about 40 disciples, mostly people from the lower ranks of life. Now he claimed to receive by revelation a command to come forth as a public preacher, and he vigorously assailed the idolatry of the Meccans, exhorting them to believe in the one true God. This aroused so much opposition that he was compelled to flee, and he went to Medina, where he already had a number of converts. The flight, known as the Hegira, occurred in the year 622 and is reckoned as the beginning of the Mohammedan Era.

The Hegira also marked a turning point in the career of Mohammed. Hitherto he had been regarded as a fanatical imposter, but now he became judge, lawgiver and ruler of Medina. He organized his forms of worship and made every effort to win to his faith the surrounding tribes. He called upon his followers to take up arms for the overthrow of their enemies, and thus committed himself to the spread of his religion by the power of the sword. After various conflicts, which resulted in the gradual conquest of the smaller tribes and a tremendous growth in the number of his enthusiastic followers, he marched against Mecca, which surrendered without resistance and accepted the new religion as the price of the lives of its inhabitants. The sacred Kaaba was purged of its idols and taken over as the shrine of Mohammedanism. This completed the triumph of the new faith in Arabia, and deputations from all the land came to do homage to the prince and prophet.

Meantime Mohammed had written the Koran, which set forth the substance of his revelations and the doctrine of his religion. He had also changed in his own character. His thirst for conquest and power had grown with his success. He began to give way to sensuous practices. After the death of his faithful wife, Khadija, he married several other wives, until at the time of his death he had nine. His conquests meanwhile continued, and in the tenth year of the Hegira he promulgated his great and last pilgrimage to Mecca, known as the "Valedictory Pilgrimage," in which a great throng, variously estimated at from 40,000 to 150,000 pilgrims, accompanied him to the Holy City. He fell sick shortly after his return to Medina, and died in the house of his favorite wife, where he was buried. The house was later annexed to an adjoining mosque and became a place of pilgrimage. See MOHAMMEDANISM.

Moham'medanism, the name by which the people of Europe and America designate Islam (entire submission to the will of God), the religion founded by Mohammed Ali in the sixth century A. D. The bible of Islam is the Koran, which is held to be of divine authority, having been revealed to Mohammed by the angel Gabriel. The book of *Psalms,* the Pentateuch and the Gospels of the Christian Bible are also held to be of sacred authority, but in a corrupted form. The Christian prophets are honored, especially Adam, Noah, Abraham, Moses

and Jesus. But Mohammed supersedes them all as the last and greatest. Islam teaches also the reality of angels made of light and of demons made of smokeless fire and subject to death; the resurrection of the dead and final judgment, with rewards and punishments. The God of Islam is the Lord God of Moses and Abraham, perfect in knowledge and power, full of glory, and known as Allah. The common formula of their faith is, "There is no god but Allah, and Mohammed is his prophet." The duties of the followers of Islam include prayer five times a day, with faces turned toward Mecca, giving of alms, fasting and the pilgrimage to Mecca at least once in their life. Chastity, honesty, truthfulness (except in certain cases) and total abstinence from intoxicating drinks are strictly required. Music and games of chance are forbidden, as also images and pictures of living creatures.

Next to Christianity, Islam has more followers than any other religion in the world, and partly because of its acceptance of Christianity and its claim to have progressed beyond it and improved it, it is the greatest barrier to the progress of Christianity in the countries where it is intrenched.

Mohave, *Mo hah' ve,* a tribe of North American Indians living in Arizona and California. Their manner of living is stable. They are agricultural and engage in beadwork and the making of baskets and pottery, in which they show remarkable skill.

Mo'hawk, a tribe of North American Indians, the chief of the Five Nations of the Iroquois confederacy. They lived in the Mohawk Valley, N. Y. They assisted the colonists in the French and Indian War, but in the Revolution they fought with the English and were driven into Canada. Many of them are farmers in Ontario and New York. See IROQUOIS.

Mohican, *Mo he' kan,* a tribe and confederacy of North American Indians belonging to the Algonquian family. They lived in the Hudson Valley and were driven to Massachusetts by the Mohawks. A reservation at Green Bay, Wis., is the home of the few who are not extinct. Branches of the Mohicans were known as Mohegans and Pequots.

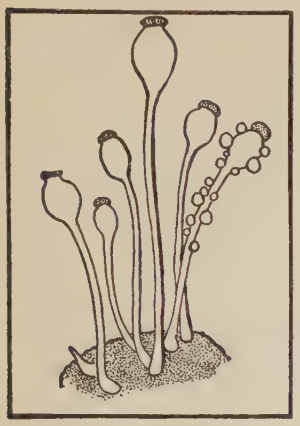
Mohonk Lake, N. Y., a widely-known summer resort and settlement at the northern end of Lake Mohonk, Ulster Co., 14 m. n.w. of Poughkeepsie and 15 m. from Kingston. The lake is situated on Sky Top Mountain, one of the highest peaks of the Shawangunk range, 1245 ft. above sea level. The development of this region and the holding of Indian and arbitration conferences here have been due to Albert Keith Smiley, a member of the United States Board of Indian Commissioners in 1879. The first conference of the friends of the American Indian met here in October, 1883. These conferences have since been held annually, their scope being gradually enlarged to include consideration of other dependent peoples or natives of United States dependencies. The first international arbitration conference was held here in June, 1895.

Moki, *Mo' ke,* or **Hopi,** *Ho' pe,* a Pueblo tribe of Shoshonean Indians, occupying seven villages upon three mesas in the north-central part of Arizona. Their villages are situated several hundred feet above the surrounding desert, and are approached by steep trails. The Moki hold to their primitive ways in ceremonial matters, but are industrious farmers and skillful potters and wood carvers. They also weave baskets and blankets. They maintain a rigid clan system. These Indians number about 1600.

Molas'ses. See SUGAR.

Mold, a fungus growth which occurs on various plants or on animal matter, causing discoloration, and decay of the tissues. The most common are the black, or bread, molds and the blue-green molds, which are commonly noticed on cheese, preserved fruits and decaying animal tissue. The spores, or seedlike bodies, are always floating in the air and are unnoticed if the air is kept circulating freely and is dry. In damp, ill-ventilated rooms or cases, starchy foods soon become coated with the quickly-growing plants, which feed upon the tissues of the

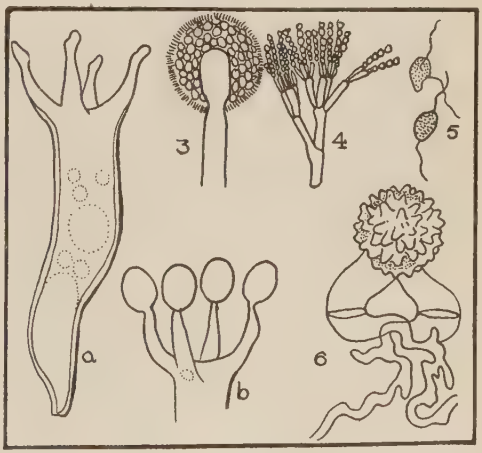
host. The molds are generally white at first and spread by long, threadlike roots, but after a short period of growth they turn blue, green or black. This coloration is due to the production of thousands of tiny spores which become scattered through the air and cause the moldy odor noticeable in damp rooms. Mold spores are killed by excessive heat and for this reason the housewife boils her canned fruit and covers it from the air. The molds are extremely destructive, though sometimes to good purpose in attacking and killing insect pests. Among the common molds are fish molds, which are half parasitic, entering the body of the living fish and feeding upon the tissues until the fish dies; and slime-molds, which are often classed as animals. The best preventive of ordinary molds is fresh, dry air.



BLACK MOLD

Mole, a family of burrowing Mammals of the class Insectivora. The moles are almost entirely subterranean in their habits and their build is well adapted to such a life. The body is short and plump, with strong but short legs and a pointed snout. The eyes are small and so well protected by fur or skin that moles have the reputation of being blind. Their ears are very keen, although no external ear is visible. The sense of smell is also acute. The tail is very short or entirely lacking. The underground passages of the mole are dug mostly in pursuit of its prey, slugs, angleworms and burrowing insects, but are also of permanent use as nests and galleries of retreat. The value of the moles' work in digging is beyond estimate, for they not only destroy harmful insects but overturn tons of soil. Moles are found in Europe, America and Africa; those of the United States generally have webbed hind feet and are somewhat aquatic in habits. See SHREW; SHREW MOLE; STAR-NOSED MOLE.

Mole Cricket, a queer little insect of the Locustid Family in the order Orthoptera. Its velvety-brown body, from one to one and a half inches in length, may be seen at the surface of the soft soil in which it burrows for food. Like its namesake, the mole, this cricket has much flattened forefeet, with which it digs, and poor eyes. It may be found in damp places near ponds and streams, where it tunnels for earthworms, plant roots and larvæ. Mole crickets are nocturnal and prefer life in their winding tunnels to that in the noisy world without. A species of mole cricket in the West Indies is destructive of the roots of the tobacco and sugar cane.



SPORES OF VARIOUS MOLDS

Mol'ecule, a name given by Avogadro (1811), an Italian scientist, to the smallest particle of a chemical substance which can exist alone. A molecule of water is so small that, in order to see it, the drop which contains it would have to be magnified to the size of the earth. We know of molecules mainly through their chemical actions, but the sizes of those of many gases have been determined with comparative accuracy; that

of the hydrogen molecule is $\frac{4}{10,000,000}$, the nitrogen $\frac{3}{1,000,000}$, and the oxygen $\frac{7}{10,000,000}$ of a millimeter.

The union of atoms of similar or dissimilar elements to form a molecule is now considered to be due to an attractive force called cohesion, whose source is electrical. See ATOM; CHEMISTRY; DALTON, JOHN.

Molière, *Mo" lyar',* **Jean Baptiste Poquelin** (1622-1673), a French dramatist, born in Paris. On his father's side he was connected with the family of Mazuel, musicians of the French court. He was educated at the Collège de Clermont, and later studied philosophy and law. In 1643, together with the Béjards, he purchased a tennis court and fitted it up as a theater, known as the *Théâtre Illustre,* of which he became manager. The project was unsuccessful, and in 1646 he abandoned it and joined a company of strolling players who were performing in several rural towns. His first comedy, *The Blunderer,* was presented in 1653. At the age of 36, Molière, on his return to Paris, had become familiar with many phases of life both in the country and the cities of France, and this wide observation he applied in the numerous successful works which he soon produced. In 1662 he married Armande Béjard, a sister of some of the members of his first company. It was while he was playing the part of the invalid in his *The Hypochondriac* that a fit of coughing brought about the bursting of a blood vessel, and death followed within an hour.

Molière's picture of society is accurate and picturesque. His playful satire on the foibles of men and their professions was too keen not to win for him enemies who directed violent attacks on him during his lifetime and meddled with his reputation after his death. Though accused of being skilled only in farce, Molière reveals a combined sense of humor and pathos such as is found elsewhere in Shakespeare and Aristophanes alone. His was called the "new comedy;" and it was new in that it was neither romantic nor political, but social comedy, and as a writer of this type he ranks among the greatest in the world. His work is refined, his dialogue is brilliant and alert, and only rarely does the seriousness which came of his too intimate knowledge of all rounds of life become tinged with bitterness. Among his dramas are *Sganarelle, The School for Women, Tartuffe, George Dandin, The Misanthrope, Doctor in Spite of Himself, The Miser, The Knaveries of Scapin* and *Don Juan.*

Moline, *Mo leen',* **Ill.,** a city in Rock Island Co. 3 m. n.e. of Rock Island, the county seat, and across the river from Davenport, Iowa, with both of which towns it is in close communication by ferries, steam and electric railways and bridges. The principal railways entering the city are the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Chicago, Milwaukee, & St. Paul. The river furnishes abundant water power at this point, which has been the means of promoting numerous industries and of making the town a commercial center. The city is one of the most important centers in the United States for the manufacture of agricultural implements. Among other articles manufactured are furniture, pianos, organs, elevators, scales, plows, cultivators and corn planters, carriages and wagons, steam engines, boilers and pumps. There are also iron foundries, saw and planing mills, steelworks and machine shops. An extensive trade in lumber, grain, machinery and agricultural implements is carried on. The city has a handsome public library building and a well-equipped city hospital. Population in 1920, 30,709.

Molino del Rey, *Mo le' no del Ra',* **(King's Mill), Battle of,** an important battle of the Mexican War, fought Sept. 8, 1847, between 3500 Americans, led by General Worth, and 10,000 Mexicans, commanded by Leon, Perez and Alvarez. General Scott ordered General Worth to make a night attack on Molino del Rey, which was a stone building with high walls and towers. But Scott's plan being impracticable, Worth did not begin

the battle till dawn; then Wright led the storming party, Garland cut off Chapultepec and McIntosh opposed the Mexican right, leaving Cadwalader for the center. Though the Mexicans fought bravely, they were finally compelled to withdraw.

Mollusca, *Mo lus' ka,* one of the largest subdivisions of the animal kingdom, including such animals as whelks, slugs, snails, cuttlefish, clams, squids, octopuses and shellfish, whether bivalve or univalve. The members of this group all have a soft internal structure and many of them are protected by shells. The shells, where present, are the product of a secretion produced in the skin, or mantle, of the animal. In bivalves the mantle may be seen lining the shell but free from it at the edges. The space between the flaps of the mantle is called the mantle cavity and contains the gills and other organs. There is no skeleton except in those Mollusks whose shells may be said to form a protective skeleton. The circulatory system is well developed and the nervous system is very complete.

Many Mollusks are free-swimming and push themselves about upon the lake or ocean floor, or burrow in the sand and mud by means of a muscular foot which may be retracted or extended at will. Others spend some time as free-swimming animals, but later, as they mature, find a rock or submerged object to which they cling, depending upon the current of the stream to bring them food. The last-mentioned families are always found in relatively clear waters, where there is no danger of the shells becoming clogged with mud. There are five divisions of Mollusca, three of which are commonly known: the Lamellibranch, including all bivalves; the Gasteropod, including slugs and snails; and the Cephalopod, including the shell-less forms, as the cuttlefish, squid, nautilus and octopus. See CEPHALOPODA; OYSTER; SNAIL; CUTTLEFISH.

Moloch, *Mo' lok,* or **Mo'lech,** a heathen god, in the Old Testament called "the abomination of the Ammonites." Jerusalem, during the decline of the Kingdom of Judah, was the seat of its worship, which included child sacrifice, particularly that of the first-born. Victims were killed, then burned. It is probable that this rite was a last desperate resort, used only in times of deepest distress.

Molt'ke, Helmuth Karl Bernhard, COUNT VON (1800-1891) a German field marshal. In 1819 he became lieutenant in the Danish army, but left to enter the Prussian service when Denmark and Norway were separated. In 1832 he was appointed to the staff and studied three years at Berlin. He was chief of the general staff in Berlin from 1858 to 1888, and he accomplished the great task of reorganizing the Prussian army. The three successful wars, upon which Germany now engaged against Denmark, Austria and France, were conducted by him, and their success was largely due to his military genius. Von Moltke was thoroughly prepared for the war with France, as he had made ready for the invasion of the country as soon as the war with Austria was over. He was made a count when the news of the surrender of Metz reached the King, and he had many other honors showered upon him, the most pleasing being the celebration of his 90th birthday as a holiday in all parts of Germany. He was modest and simple in character. His military tactics combined boldness of design and extreme carefulness in planning the details of his operations.

Moluccas, *Mo luk' az,* or **Spice Islands,** a group of islands of the Malay, or East Indian, Archipelago and made up of many small islands lying between Celebes and Papua. They are almost entirely of volcanic origin and are very fertile; their great production of spices is responsible for their common name. Rice, indigo, coffee, tobacco, fruits and valuable woods are also produced and exported. The pearl fisheries are extensive and give occupation to many of the inhabitants. The Moluccas have been claimed by the Spanish, the Portuguese and the Dutch, and are now chiefly owned by the last named. The inhabit-

ants are Papuans, Malays, Chinese, Japanese and a few Europeans. Population, 430,850.

Momen'tum, the quantity of motion possessed by a moving body. It equals the product of the mass of the body by its velocity. A ball weighing three pounds and moving with a velocity of five feet per second would have a momentum of 3×5, or 15, pounds feet per second, the unit of momentum in the English system being the momentum of a body of mass one pound moving with a velocity of one foot per second. The expression *pounds feet per second* is written after the numerical value 15 to show that in getting this value the mass of the body was expressed in pounds and the velocity of the body was expressed in feet per second. In the metric system the unit is the momentum possessed by a body of mass one gram moving with a velocity of one centimeter per second. See MOTION, LAWS OF; FORCE.

Mommsen, *Mom' zen,* **Theodor** (1817-1903), a German scholar and historian, born at Garding, in Schleswig, Prussia. He studied law and language at the University of Kiel from 1838 to 1843, and in 1844 accepted a commission to France and Italy for the purpose of collating manuscripts and inscriptions, returning three years later. He was made professor of Roman law at Leipsic in 1848. In 1852 he accepted the chair of Roman law at Zürich, going to a similar position at Breslau two years later. In 1858 he became professor of ancient history in the University of Berlin, holding this position until his death. Mommsen was perpetual secretary of the Berlin Academy and member of the Prussian Parliament. He was one of the greatest scholars of his time and the author of many works of great value. Chief among these is his *Roman History,* which is accepted as standard authority by the historians of the world.

Monaco, *Mon' a ko,* an independent Italian principality and the smallest sovereign state of Europe. With an area of about eight square miles, it lies between the Mediterranean Sea and the French Department of Alpes-Maritimes. It consists chiefly of the capital of Monaco, together with Monte Carlo and the village of Condamine. The scenery of the mountainous region is very picturesque. The inhabitants depend but little on commerce and industry, but make a living by providing accommodations for tourists. The town of Monaco is midway between Nice and Mentone and contains the palace of the prince, with an attractive garden, the cathedral in Romano-Byzantine architecture and the oceanographical museum.

Over a mile to the northeast is the famous town of Monte Carlo with its celebrated Casino, whose gaming tables are patronized by tourists from all over the world. Access to the gambling tables is denied the natives of the Principality of Monaco. The inhabitants of the whole principality are exempt from taxation, the rents of the Casino furnishing sufficient revenue. Population of the principality, 15,180.

Monasticism, *Mo nas' ti cizm,* or **Monachism,** *Mon' a kizm,* a system under which men and women renounce the worldly life and live in a house of retreat, devoting themselves to religious meditation and deeds of piety. Such places of retreats are known as monasteries and convents; their occupants, as monks and nuns. The term *friar* in its strict application refers to the members of those orders forbidden to acquire landed property and required to live by alms, as the Franciscans, Dominicans, Carmelites and Angustinians. The three vows of monasticism are poverty, chastity and obedience.

We find various forms of monasticism before the time of Christ; it was a feature of Brahmanism, was instituted by Buddha and favored by Confucius. The worship of Serapis in Egypt was connected with the establishment of monasteries, while the Nazarites of the Hebrews were in a sense a monastic order. The first Christian hermits settled on the shores of the Red Sea, and in time Upper Egypt harbored many Christians fleeing from persecution or seeking refuge from

the evil surroundings of the Roman Empire of the third century. St. Antony was the first to collect these scattered hermits and is regarded as the founder of Christian monasteries. Pachomius, about 340, founded a monastery on the Island of Tabennæ, in the Nile, and drew up the first definite rules for monastic living of which we have record. He also founded other monasteries, including one for women. St. Basil, about the same time, founded monasteries in Pontus and Cappadocia, earning the title of Father of Monasticism in the East. In the West, St. Benedict was the patriarch of monks. About 529 he founded the Monastery of Monte Cassino, which became the mother house of monasticism in the West, while the rule which he instituted had wide influence.

During the next few centuries monasteries multiplied and assumed great importance, becoming the centers of learning. The monks were teachers, missionaries and agriculturists combined, and they also rendered effective service to civilization by preserving classic and medieval manuscript literature. Among the important orders for men founded during the Middle Ages were the Congregation of Cluny, the Cistercians, the Carthusians, the Franciscans and the Dominicans. In the 12th century there also developed a number of military orders, such as the Knights Hospitalers and the Knights Templars. The members of these orders pledged themselves to make war on the infidels, in addition to taking the usual vows. The great Order of Jesuits originated at the time of the Reformation; their object at first was to bring back to the Catholic fold those who had been won over to Protestantism. Monasticism in modern times received a check in France, but has had a wide extension in the United States, where there are over 8000 men in religious orders, and about 45,000 women. See BENEDICTINES; DOMINICANS; FRANCISCANS; JESUITS; LAZARISTS; PAULISTS.

Moncton, *Munk' tun,* the second largest city of the Province of New Brunswick, Canada, 89 m. n.e. of St. John. It has a fine harbor on the Petitcodiac River, and the tide from the Bay of Fundy rises to the city, causing the phenomenon known as the tidal bore. It is on the Intercolonial and the Grand Trunk Pacific railways, and has railway shops, lumber, woolen and cotton mills and manufactories of woodenware, stoves, etc. Population in 1911, 11,345.

Mon'day, the second day of the week. Among the ancients the second day of the week was sacred to the moon, and the name Monday comes from the Old English word for moon.

Mones'sen, Pa., a city of Westmoreland Co., about 2 m. from Charleroi and 42 m. s.e. of Pittsburgh, on the Pittsburgh & Lake Erie Railroad. Bituminous coal and iron are found in the vicinity. The growth of the town has been rapid within the last few years. Monessen has steelworks, foundries and an extensive wire-fence manufactory. Population in 1920, 18,179.

Monet, *Mo" neh',* **Claude** (1840-), a French landscape painter of the Impressionist School. He recognized no master, but studied directly from nature, working in the open air and aiming to portray the fugitive effects of light and atmosphere and to reproduce an instantaneous impression of things. The juxtaposition of complementary colors in his canvases is sometimes startling, but the success of his undertaking is beyond question. Particularly strong are *The Orchard; Snow at Port Villers; On Cape Martin, Near Mentone;* and a series of cathedrals and views of London.

Money, *Mun' y,* a term used to designate the medium of exchange and the measure and standard of value. Whatever fulfills these functions, however crudely, is money.

FUNCTIONS. In primitive conditions exchange of commodities was effected by means of barter: corn was traded for clothing. But it is easy to see that as the population of the community grew, and the conditions of life became more complex and industry more specialized, this method would be increasingly difficult. Suppose the man who made clothing did

not want more corn, but wanted an axe. The farmer who wanted clothing for his corn would have to find an axe maker who wanted corn and effect an exchange with him; then trade the axe for clothing. If all three, however, knew of some common article, such as tobacco, for instance, in terms of which they could express the value of corn, clothing and axes, it would be easy to negotiate exchanges of these goods. Certain articles of universal need or recognized value thus came to be used as means of exchange; such as shells, clothing, corn, salt, wampum, cattle, furs, hides. Gradually those articles that were most convenient and durable would be chosen for this purpose. So the metals came to be used as money; and as the result of further experience, these were practically narrowed down to the precious metals as best adapted to all. Thus money developed its primary function, that of a *medium of exchange.*

But if money is to fulfill that function satisfactorily, we must know how much other commodities are worth in terms of this article. Money thus becomes also a *measure of value.* This is what we mean by prices; that is, goods are worth such and such an amount as measured by money. The enormous importance of this function of money will be recognized at once without discussion. Modern commerce and civilization would be impossible without it. There is a still further function of money, closely akin to this. Many transactions are made involving the future: a note payable five years hence; a lease running for 10 years, 20 years, 99 years. It would work great injustice for the man who assumes such an obligation today to pay twice its value or half its value at maturity because of fluctuations in the medium of payment. A *standard of value* is therefore essential, for the sake of permanency and stability. Money fulfills this function also, making possible the storing up and measuring of wealth for the future.

VARIETIES. The choice of gold and silver as money was due to the fact that they best embody the qualities requisite for that purpose; namely, intrinsic usefulness or value; the greatest amount of value in the smallest bulk and weight; divisibility, so that both smaller and larger coins may be provided (a quality of gold, but not of diamonds, for instance); uniformity, so that one unit shall be like all the others in value (not the case with fur-currency or cattle-currency); durability of material; and stability of value. These same reasons have gradually led to the adoption of gold alone as the standard in most of the important commercial nations. This was accomplished in the United States by act of Congress on March 14, 1900. In some countries, however, both gold and silver constitute the standard (See BIMETALLISM); and even in those countries that maintain a gold standard, silver coins are used, having a value determined in terms of gold (See DOLLAR), so that both are the basis of the currency, although only one is technically the standard.

There are two main kinds of money. *Standard* or *intrinsic* money is that which is intrinsically worth its face value, or practically so. Sometimes a small amount of alloy is used for the sake of greater hardness and durability; as in United States silver dollars and gold coins, which contain ten per cent copper, and are designated as .900 fine. The other kind of money is *token* or *representative* money, which is not worth its face value, but merely represents that value in various forms. Such money in the United States constitutes the subsidiary coinage of silver 50-cent, 25-cent and 10-cent pieces; the minor coinage of nickels and pennies; and the several kinds of paper money. *Fiat* money is representative money which is made legal tender by action of the government without promise of redemption in gold or silver (See FIAT MONEY). In the more highly civilized nations representative money has come to be of great importance.

COINAGE. Both silver and gold came into use as money in very early times, certainly as early as 1800 B. C., silver being first so used. But for many centuries

the metals passed by weight, as the shekel and talent among the Hebrews; and the names of many coins today are still the names of weights, as drachma, lira, pound. The difficulty of weighing money on the scales, however, was a great inconvenience; and a distinct advance in commerce was made when the pieces of money began to be stamped to indicate their weight and purity. This improvement was introduced by the Greeks about 900 B. C., and passed from them to the Romans. From the first the coining of money seems to have been recognized as a function of government, rather than of individuals, in order to secure uniformity and reliability. In the latter respect, however, unscrupulous rulers have often taken advantage of their prerogative by debasing the coinage.

In the United States the coinage now includes the following: The *standard* coinage consists of the $2.50, $5, $10, $20 gold coins, .900 fine; and the silver dollar, weighing 412.5 grains in silver, .900 fine, equivalent to a gold dollar of 25.8 grains, .900 fine, or 23.25 grains of pure gold, which is the standard. The *token* or *representative* coinage includes the subsidiary silver coins, half dollars, quarter dollars and dimes, which contain 385.8 grains to the dollar, .900 fine; 5-cent pieces weighing 77.16 grains, 75 per cent of which is copper and 25 per cent nickel; and pennies, weighing 48 grains, of which 95 per cent is copper and 5 per cent tin and zinc. The subsidiary silver coins are legal tender to the amount of $10, and the nickels and pennies to the amount of 25 cents. These coins are *fiat* money to the extent of the difference between their intrinsic value and their face value. See MINT.

PAPER MONEY. In addition to the coinage many countries have also paper money. This is wholly *token or representative* in character. It has practically no intrinsic value, but is used for the sake of convenience or to economize the precious metals, and its value depends wholly upon what it represents. In the United States this class of money includes gold certificates, silver certificates, United States notes, treasury notes and national bank notes. Gold certificates are issued by the government to represent gold of equal amount held in the United States Treasury for their redemption. Silver certificates, likewise, are issued by the government to represent coined silver dollars of equal amount held in the treasury. The United States notes, popularly known as *greenbacks* (from the fact that their backs are printed in green ink), are legal-tender notes, first issued by the government during the exigencies of the Civil War. They reached their maximum amount of $449,338,902 in 1864, during which year they were worth on an average about 45 cents on the dollar. These notes were *fiat* money pure and simple, until the Gold Standard Bill of 1900 pledged the credit of the United States for their redemption in gold, and directed the treasury department to set aside a gold reserve of $150,000,000 for this purpose. The United States treasury notes of 1890 were issued in payment for silver bullion bought for coinage, and are being retired as fast as the bullion is coined into dollars. National bank notes are issued by national banks to the extent of the par value of United States bonds deposited by them as security in the national treasury; except that five per cent of the total issue must be left with the treasurer for the redemption of worn-out bills. These bonds may be deposited to the amount of the bank's capital, if so desired. See CONTINENTAL MONEY.

CREDIT MONEY. It would be very inconvenient to conduct all commercial transactions by the actual payment of cash, and would require an enormous bulk of money. The custom has arisen, therefore, of depositing the money in a bank, and drawing checks, drafts or bills of exchange against it and sending these in payment of bills. Such paper may be regarded as a kind of representative money or as the representative substitute for money. Its use depends wholly upon credit. It has not inaptly been termed credit money. The vast majority of commercial transactions are so conducted, to

the estimated extent of 97 per cent of international commerce and 92 per cent of the commerce of the United States. See CREDIT.

FOREIGN MONETARY UNITS. The monetary units of various foreign countries, with their respective values, in United States money was as follows:

COUNTRY	STANDARD	VALUE
Argentina	peso	$ .965
Austria-Hungary	crown	.203
Belgium	franc	.193
Bolivia	boliviano	.389
Brazil	milreis	.546
British Honduras	dollar	1.000
Canada	dollar	1.000
Chile	peso	.365
China	liang or tael	.574 to .640
Columbia	dollar	1.000
Costa Rica	colon	.465
Denmark	crown	.268
Ecuador	sucre	.487
Egypt	pound	4.943
England	pound sterling	4.8665
France	franc	.193
Germany	mark	.238
Greece	drachma	.193
Guatemala	peso	.383
Haiti	gourde	.965
Honduras	peso	.383
India	pound sterling	4.8665
	rupee	.324
Italy	lira	.193
Japan	yen	.498
Mexico	dollar	.498
Netherlands	guilder or florin	.402
Newfoundland	dollar	1.014
Nicaragua	peso	.383
Norway	crown	.268
Panama	balboa	1.000
Peru	libra	4.8665
Philippines	peso	.500
Portugal	milreis	1.080
Russia	ruble	.515
Salvador	peso	.383
Spain	peseta	.193
Sweden	crown	.268
Switzerland	franc	.193
Turkey	piaster	.044
United States	dollar	1.000
Uruguay	peso	1.034
Venezuela	bolivar	.193

Since 1914 the value of the money of certain countries, especially Germany and Russia, has depreciated to some extent.

MONEY IN CIRCULATION. The amount and kinds of money in circulation in the United States on July 1, 1918, exclusive of that held in the United States Treasury and the Federal Reserve Banks, to the amount of $1,001,303,125, was:

Gold Coin	$1,107,531,243
Gold Certificates	828,231,744
Silver Dollars	77,341,545
Silver Certificates	381,806,776
Subsidiary Silver	217,206,560
United States Notes	339,936,233
Treasury Notes of 1890	1,851,130
National Bank Notes	704,137,008
Federal Reserve Notes	1,726,755,670
Total	$5,384,797,909

The per capita circulation is $50.86.

Money, Hernando de Soto (1839-1912), a United States senator, born in Holmes County, Miss. He was educated at the University of Mississippi, studied law and became a planter. Money entered the army of the Confederacy at the beginning of the Civil War and served until discharged in 1864. He was a member of the House of Representatives from 1875 to 1885 and again from 1893 to 1897; and a member of the Senate from 1897 to 1911, being appointed to fill a vacancy in 1897, and was elected in 1899 and again in 1905.

Money Order, an order purchasable at one post office and payable at the same, or another, post office. The purchaser deposits the amount of the order desired, and pays a fee of from 3 to 30 cents for the service performed if payment is to be made in the United States. For orders payable in a foreign country, the fee is from ten cents to one dollar. No order for more than $100 is sold. The person to whom an order has been made payable may transfer it, but for payment it must be presented at the office specified, and only one indorsement is allowed. In the United States the postal money order system was adopted in 1864; in England somewhat earlier. Money orders payable in almost any country in the world are now obtainable at any of the larger, and many of the smaller, post offices. Express companies, with agents in almost every part of the world, transfer annually by money orders sums which, in the aggregate, are enormous.

Mongo'lia, a vast dependency of the Chinese Republic bounded upon the n. and w. by Siberia, on the e. by Manchuria and on the s. and s.w. by China and Chinese Turkestan. Physically it is surrounded by the great mountain ranges of the Altai, the Khangai, the Sayan and the Khingan, the last of which now lie wholly within Manchuria. It is, in general, a lofty desert region 2500 to about 3000 ft. in height and partly including the Desert of Gobi. In a few isolated sections millet and barley are raised, and cattle are herded by the nomadic desert tribes. In the north there are large forests, rapid rivers and a few lakes. The Mongolians are chiefly Buddhists and are proud of their ancient race and its former glories. In 1910 Mongolia declared its independence from China, but was unable to maintain its declaration. Population, 2,600,000.

Mon'gols, a people who in the 12th century dwelt in and about Mongolia, from whom that region received its name. Under their ruler Genghis Khan (1162-1227) they made extensive conquests in northern Asia, invaded Russia and entered and conquered Hungary and Poland. Their conquests and raids were characterized by great cruelty. At the death of Genghis Khan his great empire was divided among his sons. The seat of the great khan was removed to China, and under Kublai Khan, who became great khan in 1259, the empire was divided into four parts. The first, including China, Korea, Manchuria and Tibet, with its capital at Peking, was ruled by the great khan. The second part included the Middle Tartar Empire. The third part held sway over western Asia and a good part of Russia until 1480, when Russia overthrew the Mongol rule. The fourth part included Persia, Georgia and a part of Asia Minor. It was through the rulers of this division that trade connections were made with European nations.

The rise of Buddhism and Mohammedanism weakened the power of the Mongols. In 1368 their rule in China was overthrown by a revolution, which placed the Ming dynasty in power; they divided into small tribes which went northward and were finally conquered by the Manchus. Scattered tribes of Mongols are still found in Asia. See KUBLAI KHAN; TIMUR.

Mon'goose, See ICHNEUMON.

Monitor, The, a famous ironclad, built at the Brooklyn shipyard, between October, 1861, and January, 1862, under the direction of the Swedish inventor, John Ericsson. It was 172 ft. long and carried two 11-inch guns in a revolving turret, which was 20 ft. in diameter and 9 ft. high. This 900-ton vessel looked like "a cheese box on a raft." Immediately upon being launched, the *Monitor* was taken to Hampton Roads, Va., by Lieutenant Worden, where, on March 9, she met the Confederate ironclad, *Merrimac*. A terrific contest ensued, but after four hours no lives had been lost and the vessels withdrew from the undecisive encounter. This was the first contest between ironclads which the world had ever seen, and it revolutionized naval warfare. The name *Monitor* was given to boats subsequently built after plans of the first *Monitor*. In December, 1862, the *Monitor* was wrecked off Cape Hatteras. See HAMPTON ROADS, BATTLE OF.

Monk, Frederick de Bartzch (1856-), a Canadian statesman, born in Montreal and educated at McGill University. He has long been a leader of the Montreal bar and in 1892 became professor of constitutional and international law at Laval University. In 1896 he entered the House of Commons, from 1900 to 1904 he led the Liberal-Conservative Party in his province, and in October, 1911, he was sworn to the Privy Council and became minister of public works in the Borden cabinet.

Monk, George, FIRST DUKE OF ALBEMARLE (1608-1670), an English general, born at Potheridge, Devonshire. He began his military career in Spain, where he distinguished himself. Later he was connected with the Dutch forces. He was also prominent in Irish and Scotch affairs. In 1660 he led 6000 men into London, called together the members of

Parliament who were expelled in 1648, secured a majority in favor of the dethroned Charles II, and caused him to be declared king, thus restoring the Stuart dynasty. For this service Monk was made Duke of Albemarle, privy councilor, chamberlain and lord lieutenant of Devon and Middlesex. He was also a famous sea fighter, winning victories over Admiral Tromp, and, later, over De Ruyter.

Monkey, *Mung' ky,* a general term technically applied to all members of the Primate order except man, lemurs and baboons; in its narrowest sense it excludes the apes, which are the larger Primates of the Simian Family. Popularly the term *monkey* refers to the long-tailed species which have short, narrow faces and are, in general, inferior in size to others of the order.

Those of the Old World belong to one of two classes: the small, active long-tailed monkeys which are of rather high intelligence; and the larger, shorter-tailed monkeys, which have cheek pouches for storing food. Members of both classes are comical little fellows, with quizzical faces and curious ways. They live in trees and generally move about in great herds, chattering, laughing and quarreling among themselves like a band of children. Some are beautifully marked and have silky, white, black or yellow hair, but the majority are brown or gray. They are found in Southern Asia or central and northern Africa. To this group belong the queer nose-monkey of Borneo, the quereza and the yellow rhesus, or Bengal monkey.

The New World monkeys are narrow-nostriled and of a type inferior to their Old World relatives. There are two families, the Marmoset and the Cebus. All are small, hairy creatures, some scarcely bigger than kittens, and they have long, prehensile tails that curl readily. Their home is the South American forest, where they climb with great agility and feed upon the fruits and nuts that abound. The most familiar of these are the capuchins, whose solemn face with stiff hair, standing over the forehead like a cowl, has given them their name. These are especially noted for their long leaps from the tops of tall trees to the lower branches, where they cling with legs and tail just long enough to break the fall, and then are off again. They travel in herds and seem to be led by a patriarch of the tribe who directs the line of march. Most of the organ grinders' monkeys are of this class, as they make interesting and amusing pets. The spider monkeys, howlers, woolly monkeys, sakis and squirrel monkeys belong to the same class. See HOWLER; MARMOSET.

Monkey-Bread Tree. See BAOBAB.

Monmouth, *Mon' muth,* **Ill.,** a city and county seat of Warren Co., 23 m. n.e. of Burlington, Iowa, and about 95 m. n.w. of Springfield, on the Chicago, Burlington & Quincy, the Iowa Central and other railroads. The town has a large trade in grain, live stock and produce, and is engaged in farming, horse breeding and coal mining. Among the manufactured products are farming implements, pottery, stoneware, sewer pipe, boxes, cigars and soap. Monmouth College (United Presbyterian) is located here. Monmouth was settled in 1836 and first incorporated in 1852. Population in 1920, 8,116.

Monmouth, Battle of, a battle of the Revolutionary War, the last to occur in the North, fought at Monmouth, N. J., June 28, 1778. Washington commanded the Americans; Clinton, the British. Each had about 15,000 men. As part of the engagement, Gen. Charles Lee with 6000 men was to crush the left wing of the British army, which comprised some 8000 troops under Cornwallis. To the astonishment of both armies, Lee ordered a retreat shortly after the fight began, and only the timely arrival of Washington, whom Lafayette summoned, prevented a rout (See LEE, CHARLES). With much difficulty Washington reformed Lee's broken lines and ordered a general attack. Each side lost about 400 men. Washington considered the battle a defeat; but Clinton continued on his retreat to New York.